THE IRON AGE

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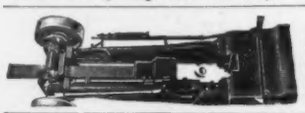

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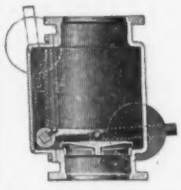

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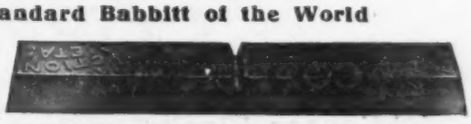

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THE IRON AGE

New York, Thursday, December 12, 1907.

THE KOPPERS COKE OVEN.

ANOTHER BY-PRODUCT SYSTEM INTRODUCED FROM EUROPE.

During the past few years the coke oven design of Heinrich Koppers of Essen-Ruhr has been received with increasing favor in Europe, and since it has been accepted for one plant in this country, at Joliet, Ill., a description based upon the latest printed data available will be of interest to American readers. The Koppers oven design may be regarded as the culmination of the desire to secure as complete control as possible of the heating of the oven, and therefore of the coking operation. It is of the vertical flue type with single flued walls, and provision is made for a separate Bunsen burner for each individual vertical flue, of which there are from 28 to 32. Each of them is capable of individual regulation.

Koppers builds two kinds of oven—one called the "waste heat oven," in which the surplus heat is available in the form of a hot waste gas, the other the "regenerative oven," which produces the surplus heat wholly in the form of a combustible gas.

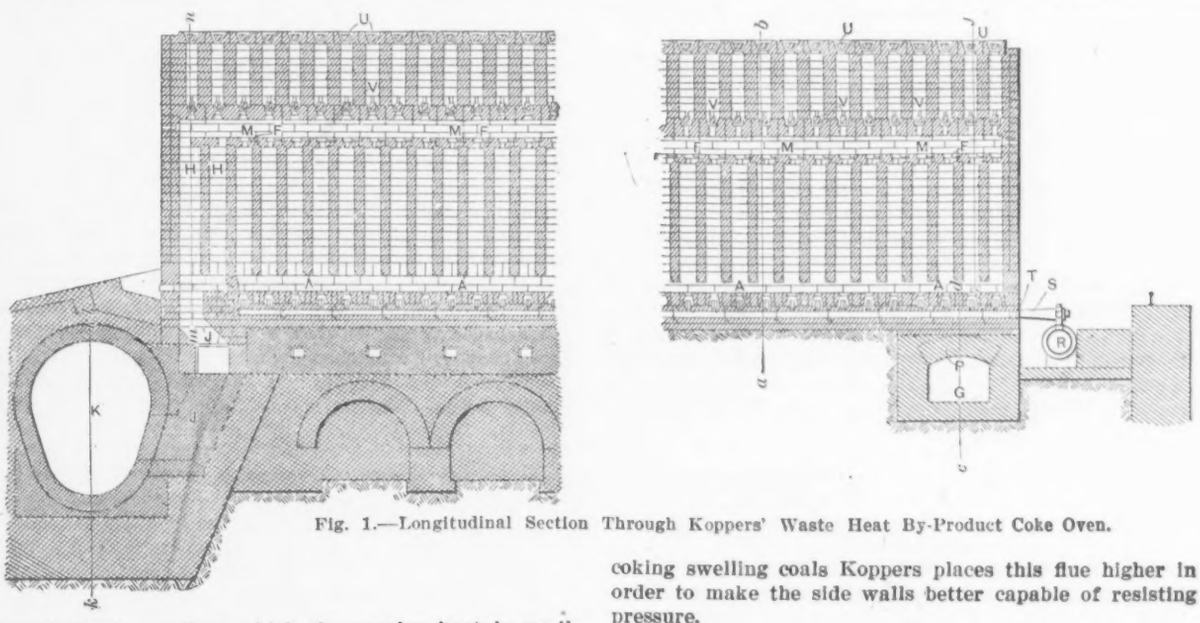


Fig. 1.—Longitudinal Section Through Koppers' Waste Heat By-Product Coke Oven.

The Waste Heat Oven.

The arrangement of the heating system is shown in the accompanying Figs. 1 and 2. The gas returning from the condenser plant flows through the main pipe R and the branches S, at the right side of Fig. 1, into the distributing flue T under the walls entering from the flue T into the vertical heating flues through the gas nozzles A after being mixed with the adequate amount of air of combustion. Rising in the vertical flues, it flows into the collecting flue M, and thence descends through the two flues H at the right of Fig. 1 through J into the waste heat flue K. Koppers, therefore, has now decided the question of the most satisfactory arrangement of the discharge flues by having two descending flues at the right hand of the oven. Each individual vertical heating flue may be throttled by moving the sliding brick damper F. These dampers are operated from above after the seals U and V have been removed. In this manner the supply of gas may not alone be regulated by the aid of the gas valves, but also by throttling the escaping gases of combustion. The gas nozzles A are accessible from above in the same manner as the sliding brick dampers F. It is stated that the changing of nozzles which have been burnt tight is easily accomplished provided the heating flue involved has been stopped for awhile.

The supply of heating gas for each oven is of course capable of regulation through a valve. The throttling of each individual flue makes it possible to heat the oven walls very uniformly and permits of very close control of the operation, at the same time securing a low consumption of gas in producing a good coke. These objects Koppers formerly aimed to secure by narrowing the upper horizontal flue M, Fig. 3, in the direction of the highest gas pressure. This design, however, has been given up since it was found that it was unnecessary, in view of the excellent regulation obtainable through the slide dampers F. The flue M is placed below the roof of the oven as closely as possible, so that its heat may be utilized for the operation and losses by radiation be avoided. In coking swelling coals Koppers places this flue higher in order to make the side walls better capable of resisting pressure.

The supply of air for combustion is provided in the following manner: It enters the distributing flue B, Fig. 2, and from this flows through small tuyeres, C, at right angles to the gas nozzles, rising in an annular space around the escaping gas. As the result of the method of regulation of the coking operation and the absence of any heating of the floor of the oven, the Koppers waste heat oven does not require very serious foundation work. When the ground is rocky a simple block of concrete is used. The air for combustion in that case is usually brought from the machine side of the oven. It is possible to utilize also old foundations, as shown in Fig. 1, at the left side, which indicates a reconstruction of an old plant. The ovens have simply been built on top of an old foundation indicated in the drawing by cross hatching.

The Regenerative Oven.

In his first plant Koppers followed the usual arrangement of placing the regenerators in two longitudinal flues. Now, however, he fills the entire space below the ovens with checker work and gives every oven its own regenerator, as shown in Figs. 3 and 4. The execution of this fundamental idea in detail may be seen from the drawings. The ovens rest upon strong walls, which lie between the regenerators, and the checker work of the latter is borne by abutments on the separating walls and by two piers below the checker work.

The necessary division into two parts of each regenerator is brought about by the central flue W, Fig. 3, this

flue in the more recent plants being placed somewhat closer to the drawing side of the oven. This arrangement has been adopted in order to meet the requirements of the conical form of the oven in this direction. By locating

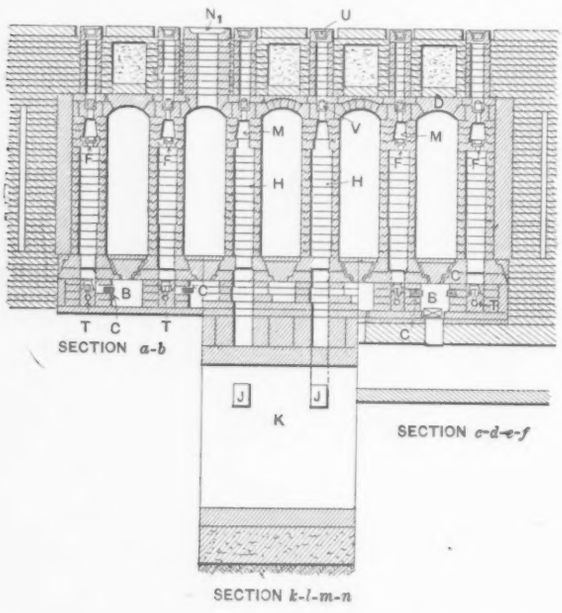


Fig. 2.—Cross Sections of Koppers' Waste Heat By-Product Coke Oven.

the central flue W in this manner provision is made for 14 gas nozzles on one side, while there are 17 nozzles on the other, thus crowding the nozzles more closely together on one side and increasing the heat at the point where the body of coal is thicker, owing to the conical shape of the oven.

As the arrows in the drawings indicate, the air of combustion flows from the distributing flues K_1 and K_2, is distributed to the individual regenerators, is heated in them and flows through openings in the roof to the lower horizontal flue. Through the opening C it then reaches the main heating flue. On the other side of the regenerator the gases of combustion take the opposite course. Mixture of the gas with reheated air of combustion takes place a little later in the regenerative oven than it does in the waste heat ovens shown in Fig. 1, in which the air enters at right angles to the direction of the flow of gas. The object is to prevent the formation of blowpipe jets.

Connection between the waste flue and the individual regenerators was formerly provided for through small horizontal flues J_1 and J_2. More recently Koppers provides for this connection by fittings shown in Figs. 8 and 9, each of which can be closed by a horizontal slide valve F, Fig. 9. By this arrangement the independence of each individual oven is emphasized. Each oven is subject to the regulation of the valve, either at the waste flue or at the air supply flue. For heating up the ovens, openings, N_3, are provided in the roof as shown in Figs. 3 and 4, from which channels Q lead to the distributing flue M connected with the heating flues. The gases which are developed in heating up the oven may, therefore, without opening the valves V_1 and V, escape through N_3 and N_2 into the vertical flues, and through these into the regenerators and the waste heat flue.

Through Koppers' latest design of the regenerator its available heating surface is considerably increased, since

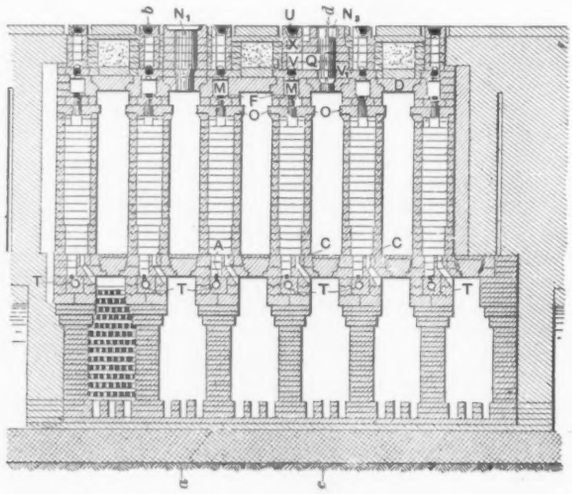


Fig. 4.—Cross Section Through Regenerator Oven..

about two-thirds of the space is filled with checker work. The heat is kept well together, and thus a very active heating of the regenerator is obtained. On the other hand, it might appear as though Koppers' design in which every oven has its own regenerator might lead to irregularities in the heating of the oven, since the chilling effect of a fresh charge of a neighboring oven or irregularities in the operation is not equalized by the waste heat of the adjoining ovens. When it is considered, however, how great is the capacity of the Koppers regenerator and the uniformity of temperature which must follow, it will be recognized that such small fluctuations have little effect, in view of the great amount of heat stored. This has been proved to be so in practice.

A discovery of more than ordinary importance has recently been made by Koppers in regard to the regeneration of air for combustion and the utilization of the waste gases. It was found by observation and experimental tests that the heat of the waste gases could not be reduced in the regenerator below a certain temperature, no matter of what capacity they were made, and the result

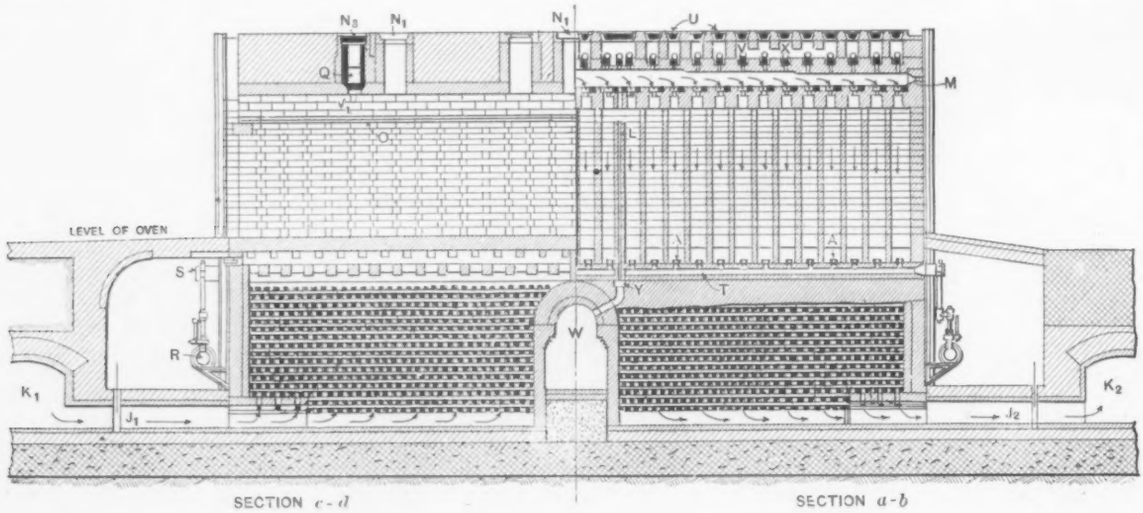


Fig. 3.—Longitudinal Sections of Koppers' Regenerative By-Product Coke Oven.

of calculation showed that the whole of the heat in the waste gases could not be extracted by means of regenerators. Koppers ascertained that this was due to the air

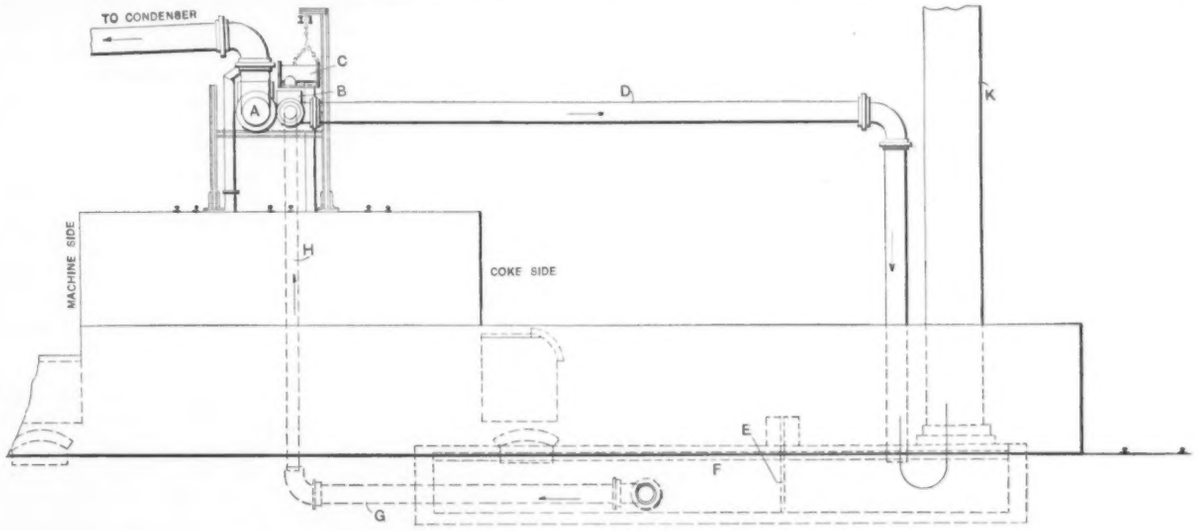


Fig. 5.—Apparatus for Taking Care of Gas Generated in Charging Coke Ovens.

only being regenerated, the gas being admitted in a cool state. The proportion of gas is from one-sixth to one-seventh of the quantity of air, and consequently the volume of the waste gases is about 16 per cent. greater than the volume of the air that it has to heat. A loss of heat, therefore, took place by passing the whole of the waste gases through the regenerators, and in the latest construction of the Koppers ovens means have been introduced to enable a portion of the waste gases to be drawn off in a hot state for boiler firing purposes. This is shown in Fig. 3. The flue L is provided to withdraw a portion of the hot waste gases into the central flue W beneath the ovens and conduct it to the boilers. A sliding brick is placed at the top of the vertical flue L, by means of which the quantity of waste gases to be drawn off can be regulated. This arrangement is being tested at a new plant in lower Silesia.

Each oven is provided with three charging holes. In order to prevent the obnoxious escape of gases during the charging to the oven Koppers builds his more recent plants with two gas catchers. As is shown in Fig. 5, he uses removable fittings, which may be carried to the oven about to be charged and connected with the pipe B. In order to prevent any danger of explosion by access of air, and to avoid stopping up the pipe with tar, the fitting is connected with the waste heat flue by a clay pipe line, G, Fig. 5, in such a manner that the gases flowing in the direction indicated by the arrow carry off the gas escaping during the charging through the pipe line D to the stack K. The gas flowing through the pipe G is regulated by means of the valve E.

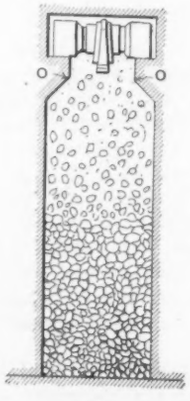


Fig. 7.

Koppers has given special attention also to the mechanical leveling of the charge. If the coal has a disposition to swell, so that it must not be too much compressed during the leveling process in order to prevent injury to the oven walls, then the leveling is done by means of sheet iron wings attached by angle iron to the leveling rod. These are shown at *d d* in the accompanying drawing, Fig. 6. If, however, the leveling may be done under pressure, then the yokes *e* are employed, whose pressure makes it possible to increase the charge by about half a ton. Koppers guides the leveling rod not alone in the driving cylinder, but also in the oven itself by providing offsets O, Fig. 7, in the masonry upon which the rollers *f* travel.

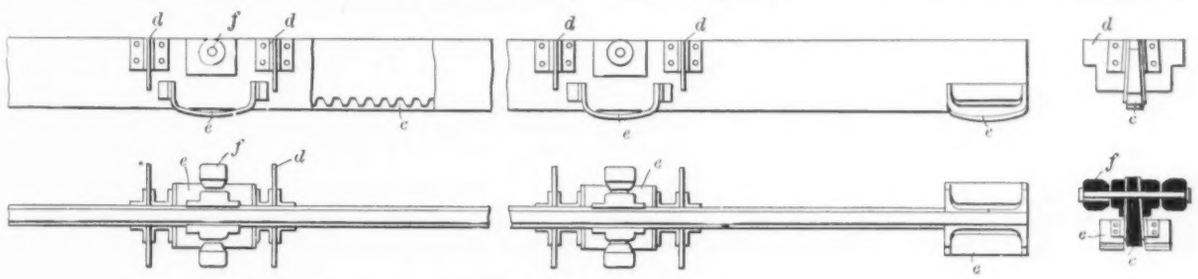


Fig. 6.—Coke Leveling Apparatus.

Automatic Reversing.

It is the plan of Koppers also to introduce a regulation of the gas and air supply automatically by electrical

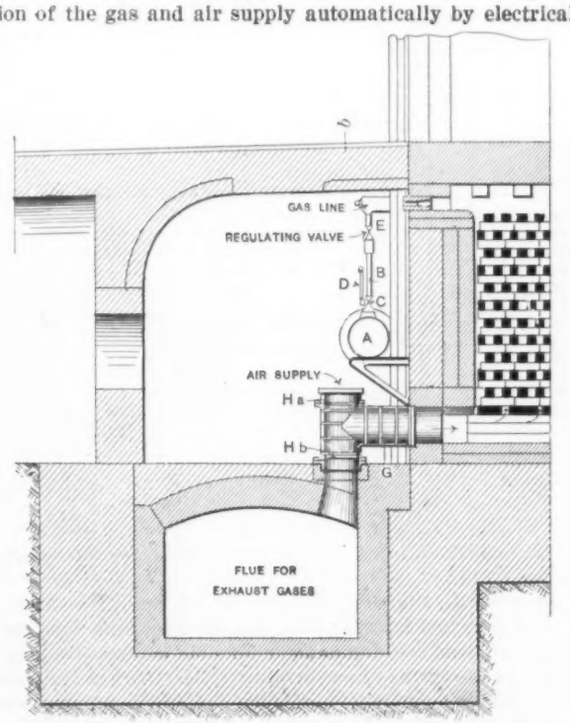


Fig. 8.—Automatic Reversing Device, End Elevation.

means every half hour. The apparatus which he has designed for this purpose is shown in the accompanying Figs. 8 and 9. Every branch gas main is provided with two cocks, the regulating cock E, Figs. 8 and 9, and the cut-off valve C. The fittings G, Figs. 8 and 9, which serve for the supply of the air of combustion and for carrying

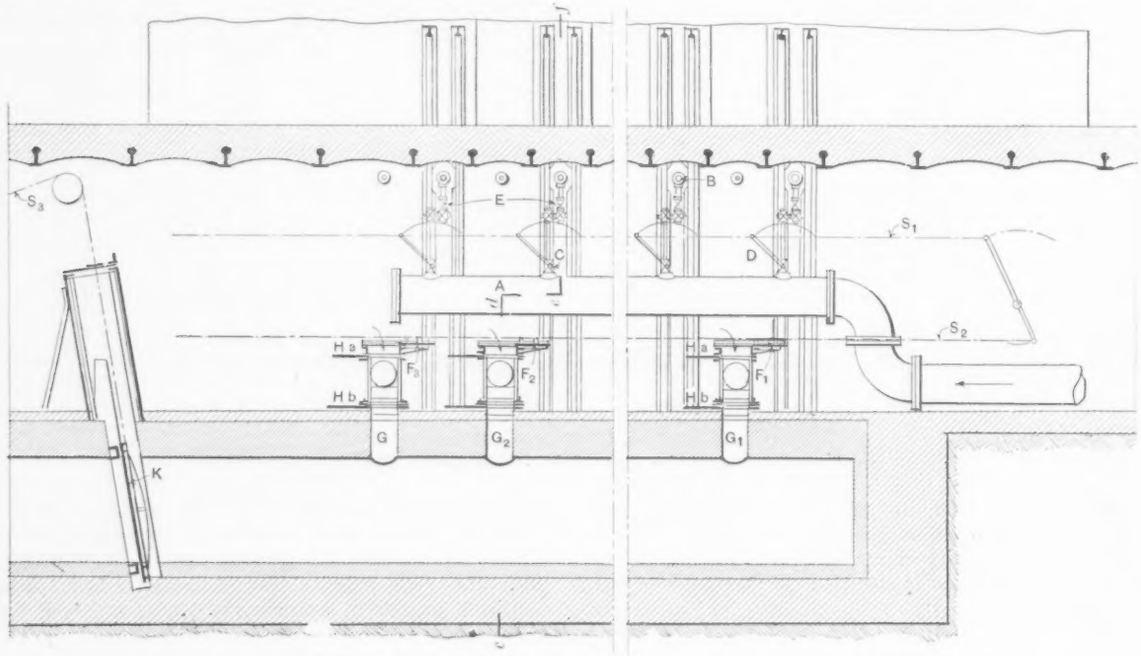


Fig. 9.—Device for Regulating Gas and Air Supply, Side Elevation.

off the exhaust gases are closed by a horizontal slide valve F, Fig. 9. In the main gas line there is a main cut-off valve J, Fig. 10. At the end of the entire travel of the flame there is a cast iron smoke damper K, Fig. 9, in the flue. It is necessary, therefore, to operate the cocks E, the slide valves F, Fig. 9, the cut-off valve J and the damper K. The valves and the damper are operated by the shaft L, Fig. 10, the cocks E and the slide valves F being actuated by T_1 and T_2, Fig. 10, while the wire ropes S_1 and S_2 actuate the damper K. The entire reversing is brought about by the controller roller O, Fig. 10, whose small motor operates constantly and which reverses once every half hour. This roller, through the intermediary of three contacts, starts first the motor P, Fig. 10; then the motor N and then once more the motor P. The motor P is required only for the cut-off valve J, Fig. 10, while the motor N drives the shaft L. The first starting of the motor P, therefore, cuts off the main gas valve. By the motor N the simultaneous reversal of all the other cocks and valves is secured, and thereupon finally the motor P again opens the gas main. The drive M, which also acts upon the shaft L, is operated by hand, and is used only when the electrical apparatus is out of order.

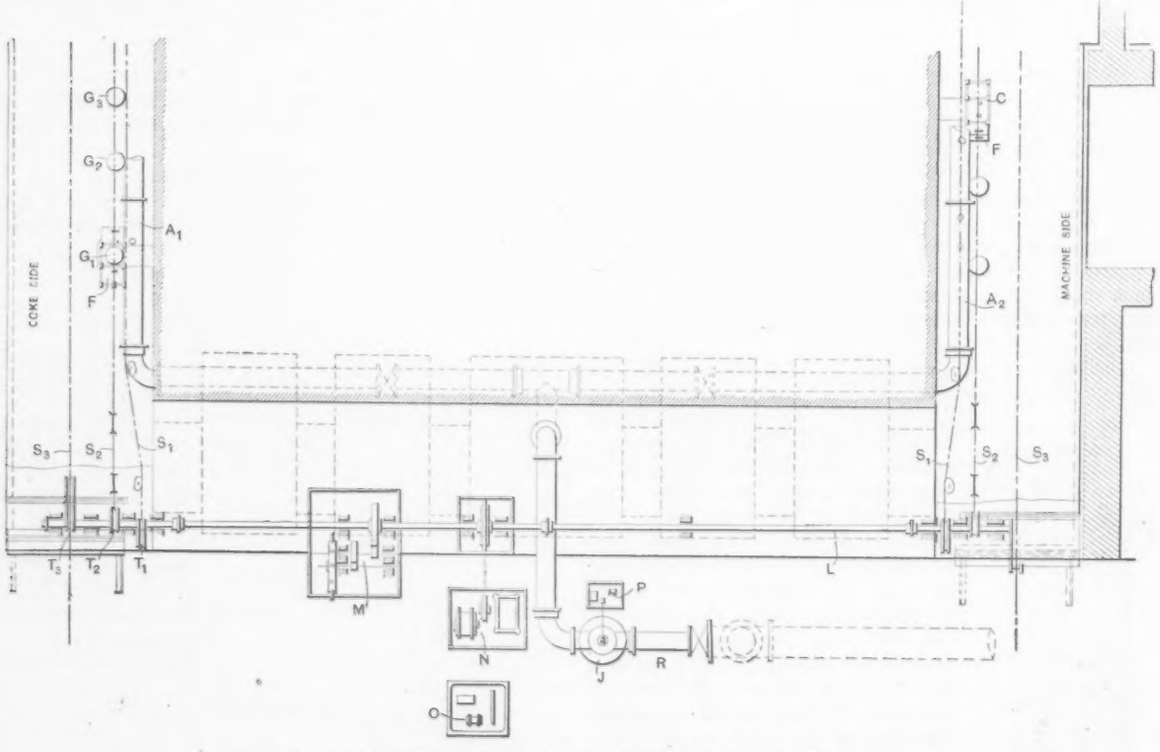


Fig. 10.—General Plan of Apparatus for Regulating Gas and Air Supply.

Gas Washer and Condenser Apparatus.

In building the condensation apparatus Koppers has taken a remarkable step in that he treats the raw gas, after the tar has been deposited, with sulphuric acid in order to dispense with the washers for the absorption of ammonia. At the same time he arranges that the final sulphate is discharged mechanically, so as to get rid of the troublesome discharge by hand and to secure continuous operation.

The general scheme of the Koppers condenser, as it

has been introduced at the Mont Cenis colliery, is shown in Fig. 11. The hot gases as they come from the ovens first pass through the so-called heat equalizers A and C, whose function is twofold. First, it is the object to cool down the hot gases in order to make it possible to deposit from them the tar and gas water. Secondly, its function is to again warm up the gas which has been deprived of its tar, and which in this cooler flows in the direction contrary to the hot raw gas, so that the steam contained in it remains gaseous and the solution in the sulphuric acid bath is not unnecessarily diluted. From these coolers the gases are conducted through the exhauster D to the tar tank E, and are sent back from the latter through the pipe line F to the cooler and through the pipe B into the liquor tank. This tank is in two parts—that is to say, the formation of sulphate takes place in two sections. Sulphuric acid enters through a lead tube.

The gas is conducted to a point very close to the bottom of the tank H and enters an annular space between the outer wall of the tank and a screen cylinder placed within the tank. Through the latter the gas is forced to enter into the acid bath in thin jets, thus securing intimate contact. The flow of acid into the first reservoir is so regulated that the bath is always acid, and that therefore a deposit of sulphate is avoided. The liquor here formed is carried through the pipe line K to the second tank L. The gas water formed during the process

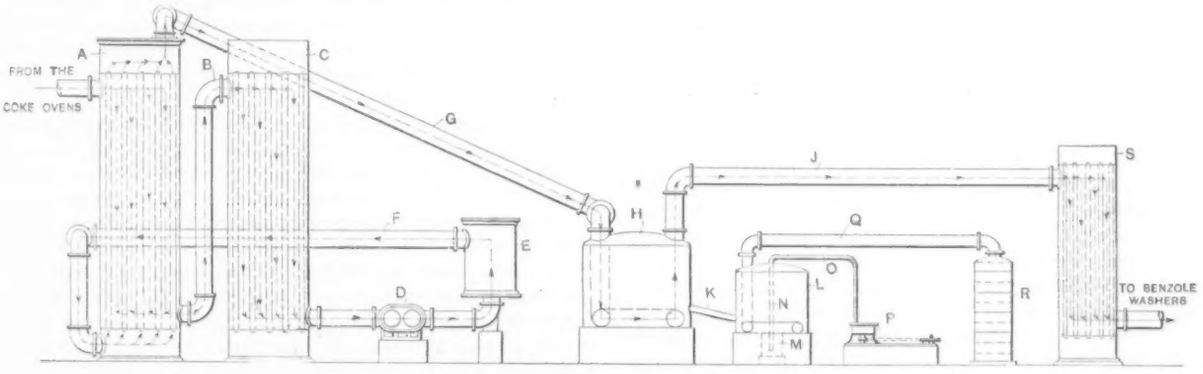


Fig. 11.—Elements of Koppers' Coke Gas Washing and Recovery Plant.

of depositing the tar is conducted to the apparatus R, in which it is distilled as usual by steam, with the addition of lime. The ammonia vapors here secured flow through the line Q into the second tank L, so that the bath now becomes alkaline and the sulphate can separate in order to be discharged in a semiliquid condition through the ejector O. It is dried in the usual manner by the centrifugals P and by steam heat. The gas which leaves the first tank H, deprived of its ammonia, is further utilized in the usual manner, since its other useful constituent has not been changed by the treatment with sulphuric acid. At the Mont Cenis colliery it is conducted through pipe lines J to the water cooler S, and is worked up for benzole.

Notwithstanding the retarding effects of financial conditions, the American Blower Company, Detroit, Mich., reports its business to be holding up remarkably well, shipments up to December 1 having been practically equal to those for the same period last year. Among the large orders under way or recently shipped are a complete heating and ventilating apparatus for the Wall Paper Manufacturers, Ltd., London; a like equipment of four large units for the machine and finishing departments of the Champion Coated Paper Company, Hamilton, Ohio; heating apparatus for the new plants of the New York Central & Hudson River Railroad, and some equipment for the extension to the Singer Building, New York.

The Freeport Mfg. Company, Freeport, Ill., has changed its name to the Stover Gas Machine Mfg. Company. This company, which began the manufacture of gas machines early last spring, has already found it necessary to increase its facilities.

The Production of Natural Gas in 1906.

WASHINGTON, D. C., December 10, 1907.—The production of natural gas in the United States in 1906 amounted to 388,842,562,000 cu. ft., measured at the atmospheric pressure, or 9,396,963 net tons. The value of the output was $46,873,932, an increase of $5,311,077 over 1905. Since the gas production of the country was first reported by quantity in 1906, comparative figures for 1905 cannot be given. The great gain in 1906, amounting in value to 12.8 per cent., was partly an incident of the increased activity in oil exploitation in the midcontinent field, and was still more largely due to continued development in West Virginia, where the increase was more than $3,500,000, and in Ohio, which reported a gain of $1,400,000. Pennsylvania lost ground to the extent of $639,091, or 3.3 per cent., while Indiana suffered a decrease of nearly half its product, or 43.4 per cent. The Pennsylvania industries employing gas as fuel, and notably the iron and steel works, did not find their supply curtailed as the result of decreased production, for a large quantity of gas was piped from West Virginia, and the actual consumption in Pennsylvania showed an increase of fully 10 per cent. Ohio also borrowed heavily, and the distribution of natural gas, which was more general in 1906 than in any previous year, not only tended greatly to the steadying of the gas industry itself, but to the development of all enterprises dependent upon it. The transportation of natural gas being so much cheaper than that of coal, the gas was enabled to compete with coal at comparatively greater distances.

It will be observed that the value of a ton of gas in 1906 was approximately $5, while the average price of bituminous coal during the year was only $1.11; nevertheless, gas was a cheaper fuel owing to its superior thermal efficiency, weight for weight, and the great economy of labor in its use and the cost of removing ashes.

The following table shows the consumption of natural gas in the United States in 1906 by States:

State.	Quantity. 1,000 cu. ft.	Cents per 1,000 cu. ft.	Value.
Pennsylvania	162,095,173	13.0	$21,085,077
Ohio	74,812,562	16.9	12,652,520
West Virginia	58,455,009	6.3	3,720,440
Kansas and Missouri	69,468,461	5.8	4,030,776
New York	10,182,422	26.0	2,654,115
Indiana	7,861,140	22.2	1,750,755
Kentucky	789,154	36.4	287,501
Oklahoma	3,408,128	7.2	247,282
California	153,021	87.9	134,560
Alabama, Louisiana and Texas	1,038,569	14.5	150,695
Illinois	409,556	21.3	87,211
Colorado	23,567	96.7	22,800
Arkansas and Wyoming.	120,500	28.6	34,500
South Dakota	22,900	67.2	15,400
Tennessee	2,000	15.0	300
Totals	388,842,562	12.1	$46,873,932

The combined value of natural gas and crude petroleum increased from $125,720,254 in 1905 to $139,318,667 in 1906—a gain of over $13,500,000—and was the greatest value ever recorded. Every producing State joined in the gain except Indiana and Colorado. Pennsylvania was still in the lead, followed by West Virginia, while California, first in quantity of oil produced, was sixth in total value.

W. L. C.

A Uniform Cost System for Jobbing Foundries

As Recommended by the Jobbing Founders' Association.

PREPARED AND PRESENTED BEFORE THE PHILADELPHIA FOUNDRYMEN'S ASSOCIATION, DECEMBER 4, 1907,
BY JAMES S. STIRLING.

At the recent annual convention of the American Foundrymen's Association, held in this city last June, I had the opportunity of making a short address on the floor of the convention on the subject of "Uniform Cost Accounts for Jobbing Foundries," outlining at that time in a general way what a small number of jobbing foundries through the organization of the Jobbing Founders' Association had attempted to do along this line, and also of asking the co-operation of the Cost Committee of the American Foundrymen's Association in the completion of the work.

History of the Movement Toward Uniform Cost Accounts.

The Jobbing Founders' Association was formed in March, 1906, through the initiative of H. D. Miles, president of the Buffalo Foundry Company, Buffalo, N. Y., who, in a circular letter to some 70 concerns, invited their attendance to a conference at the Hotel Astor in New York City. It was the desire in calling the meeting to ascertain if possible the reason for the wide variation in prices which almost invariably occurred in the jobbing trade and to eliminate if possible the apparently general rule of taking work at certain low prices "because competitors were willing to do so." This meeting was attended by about 20 representatives of various concerns from the East and Middle West, and a very short discussion seemed to show that the cost keeping systems in use in the various plants, no two of which seemed to be alike, were mainly responsible.

This discussion showed that many different systems as well as many "no systems" were in use, and it was finally decided to appoint a committee for the purpose of devising some uniform system which could be used in all foundries with a near approach to accuracy and equity. This committee met from time to time during the following year, and, after considering a number of different types, selected, by elimination of what they considered incorrect portions, a rather composite system which embraced the good portions of each. To this they added certain determined upon sections and then engaged the services of a well-known foundry cost expert to consolidate the different elements into a satisfactory and simple shape. This was done even to the extent of preparing printed blanks for use which would cover every operation of cost keeping.

It was then decided not to attempt to change too much the detail mattters of time keeping, billing, shop practice as to how orders should be handled, &c., but to devote the principal effort to the proper division of the elements which constitute a complete cost, allowing each foundry to obtain details as best suited them.

Basis Upon Which an Agreement Was Reached.

It had been decided that the elements constituting the cost of the foundry product were: (*a*) productive labor; (*b*) metal; (*c*) expenses, this latter element being divided into three separate and distinct classes: (*d*) productive expenses, which consist of all such expenses as are practically fixed in their nature or not affected by the variation in the amount of production; (*e*) tonnage expenses, which consist of all expenses which are directly affected by the amount of metal produced; (*f*) commercial expenses, which are those directly connected with the sale of the product.

It was also decided that the most equitable way to distribute these various elements of costs was as follows: (*a*) productive labor, direct to the product; (*b*) metal, direct to the product; (*d*) productive expenses, on the basis of productive wages expended; (*e*) tonnage expenses on the basis of tonnage or weight of net good castings made.

The sum total of this distribution represents the net shop or foundry cost.

The commercial expenses (*f*), being disconnected with the actual production, it is recommended to distribute over the sales.

In order to show more clearly just which items we considered to be chargeable to productive and which to tonnage expense, I have prepared a "Table of Accounts," showing the make-up of these various elements, which can be subdivided into as many detailed accounts as may be desired, together with a chart showing the mode of assembling them. [The "Table of Accounts" and chart are shown herewith.—Editor *The Iron Age.*]

No Cost System Will Remedy Mismanagement.

To use an expression made by one of the members of the committee, that "no cost system can be of any use unless used with judgment," is to express in a few words that neither this nor any other system can be absolutely depended upon to remedy all the evils of foundry mismanagement, but a proper attention to the various elements of costs here shown, and which are those which comprise the costs of all foundries, will tend to eliminate the great factor of uncertainty now apparently prevalent in many if not all places of our business.

Our committee leaves to each individual the determination as to whether his cost keeping should be considered a part of his general books, but advises its being done. In interweaving this system with the general accounting, it would be necessary to carry a ledger cost account. In addition to the general ledger it will be found convenient to keep a subledger for the purpose of handling the various subaccounts of foundry orders, metal, coke, sands, lumber and other supplies. In the subledger each brand of pig iron, &c., has its separate account, which is debited with all purchases and credited as used.

Statement Regarding Printed Forms.

With no desire to intrude any personal features into this paper, but merely in order to show how this system can be adapted to a general jobbing foundry business, I am taking the liberty of showing some of the various printed forms used by the company with which I am connected and the extent to which we go into the details of our costs. [These forms are so clearly described by the author that they are not reproduced here.—Editor *The Iron Age.*]

Let us assume that we are handed an inquiry, together with a blue print, for a casting. This print is taken by our superintendent, who makes out on the Superintendent's Estimate Sheet his estimate of the time, &c., necessary to produce the casting. This form is given a consecutive number, and provides for a certain description of the proposed casting, number required, weight of each, pattern data, if to be furnished us or an estimate of the cost if we make it, estimate for fixtures, special flasks, &c., and time for molding, casting and cleaning, approximate mixture, approximate weight of core rods, runners, gates, &c. This estimate then comes to the office, where the Office Estimating Sheet is made out, which includes expenses, freight or any other charges.

When an order is received it is given a progressive number, these orders being divided into three classes: (*f*) orders covering castings for sale to customers; (*e*) orders covering equipment work; (*r*) orders covering replace castings.

These are made out by our stenographer in quadruplicate. One copy is sent to the superintendent, one to the shipping clerk, one to the cost desk and the other is placed in the office order book and is considered the original. The shipping clerk is also responsible for the proper marking up of the various patterns, gummed labels being used for this purpose.

Our Weekly Time and Payroll Sheet, which becomes a book of original entry, is what is usually called a "balancing" payroll, called so for the reason that the

sum total of all charges in the recapitulation columns must exactly agree with the sum of the total wages paid. It is subdivided into days and each day into charging columns representing those accounts most frequently used. The time of each employee is collected by the timekeeper and entered by him in its proper column, the total number of hours at the respective rates counted out and recounted and placed in the total column. The time is then recapitulated, productive labor being put into the productive column and nonproductive in the nonproductive column.

Our Cost Sheet especially provides for the proper entries to cover every element which enters into the cost, together with each sale made. All charges for time to the various costs are made directly from the payroll to the several cost sheets—one or more being taken out for each order.

These sheets have provisions for showing the various classes of workmen, amount and value of metal, outside purchases, sales or deliveries, &c. At the end of each month the various entries covering expenses are made on these sheets—both productive, which is applied by a percentum factor of productive wages paid and tonnage, which is applied in cents or mills per pound of castings.

Heat Sheets.

As the timekeeper collects the time from the various men he also takes up the heat, *i. e.*, ascertains just how many pieces of each pattern are made by each molder. This heat sheet is passed to the shipping clerk, who follows up every heat and finds out just what castings are good and what bad. If any are bad he issues a replace or "R" order covering them, and marks the pattern up accordingly. This heat sheet remains with him until delivery is made of the castings, he making a note of delivery by means of a rubber stamp, showing the date delivered. By this sheet we are able to obtain a complete history of any particular order; to ascertain by whom the various castings covered by any order were made; the number defective; and the daily average of each molder, with the amount of bad castings made by him, together with the reason why castings were condemned.

The Sales Reports are also numbered consecutively, and are so numbered as a check for the bill clerk in invoicing, all numbers having to be accounted for. On these slips we show articles, pattern uumber, our order number, customer's order and requisition numbers, weight, rate and amount, with check columns for office use. These are always made out in duplicate, the duplicate becoming a manifest or delivery memorandum for the customer. The foundry memorandum is removed from the copy sent the customer, but the original, which is retained in the office, is used for the purpose of checking up deliveries in the various order books, and for noting that the article had been regularly entered upon the cost sheets.

Additional printed forms are our Material Ledger and Stores Ledger Sheets, Cupola Reports, Daily Report of Employees and Summary of Completed Costs, the latter showing both the actual and estimated time and value costs.

Various other forms are used for other purposes, such as indexing names and rates of employees, change of rate, shop requisitions for materials, &c.

As monthly reports for comparison, we make summaries of our Cupola Reports, which show the amount melted, ratio of fuel to metal, number of and average size of each heat, proportion of pig and scrap, percentage of loss in melting, pounds of good and bad castings, cost per pound of good castings made for all metal used, expenses which we divide into such items as shown on the table referred to heretofore, proportion of productive to nonproductive hours, summary of all costs, showing the profitable and the unprofitable jobs at a glance, and on our own work, showing cost per pound for productive wages, productive expense, tonnage expense, core rods, fixtures and metal; that of productive wages being further subdivided into the various classes of workmen to keep in touch with variations, &c.

We close our books every month, taking off a regular trial balance and statement of assets and liabilities, showing accounts receivable and when due, as well as accounts payable.

Method of Handling Metals.

A description of our method of handling metals may be interesting. For convenience, and to be able to keep properly in touch with our various lots, we abandon the brand name and substitute an analysis number. Each car of iron as soon as received is separately piled, numbered, sampled and analyzed, and thereafter that particular pile is not known as No. 1 X Crane or Thomas, but as No. 126, or whatever its analysis number is, and as No. 126 it is weighed and charged into the cupola and reported on the daily cupola report. At the end of the month, if this entire pile is used, No. 126 in the subledger should balance itself; if it does not balance we force it by either debiting or crediting the difference, so that we include the total number of pounds and total value as purchased and paid for in the "Cost of Metal."

This same "overs and shorts" method is used in charging all of our various supplies. By this method we are able at any time to inventory our stock.

Too much cannot be said of this method with the expense materials, such as sands, gravels, &c., which are affected by moisture, as it is necessary to know that every dollar expended for them has been charged to expenses. With these articles we endeavor to keep daily and monthly records of what is used, making subledger entries and expense charges at the end of the month, verifying the inventory by estimating when the material has not all been used and by arbitrarily charging or crediting when the bins are empty or approximately so.

All core rods are weighed each day, and the weight is charged to the respective orders. The labor of making them is considered productive, and as such is charged direct to the order. The metal is charged at the monthly rate of "Cost of Metal," and the job is credited with the scrap value.

All gates, runnners, sprues, &c., are gathered up as far as possible each day, particular care being taken to clean up at the end of the month, and the "Foundry Scrap Account" is charged with them ("Cost of Metal" being credited) at a price determined in accordance with the market price of bought scrap. When used over again this subledger account is credited and it again enters "Cost of Metal."

"Bought Scrap" is another subledger account, being charged with all purchases and credited with amounts as reported from cupola. This same evening up process is used here as before described, though owing to its nature it is more dependent upon estimate than the other commodities.

Condemned Castings.

Condemned castings are divided into two classes, those which are condemned in the foundry before entering into sales and those returned by customers. The former class is treated as foundry scrap, the latter as bought scrap. In both cases the cost of making the replace casting, *i. e.*, the labor on it, becomes nonproductive labor and is charged to expenses. The metal of this replace casting, which becomes a "sales" is charged to the original order at the "Cost of Metal" price. Here we admit a certain inequity, as the first casting, if condemned in the foundry, does not specifically reach the sales, but is taken up in the "Cost of Metal," whereas, if it is condemned after delivery, the original order has to stand the cost of metal on the replace casting, as well as the difference between the original cost of metal price and the scrap value of the returned casting.

We deem it correct to consider the cost of making replace castings to be an expense of the operation of the foundry and not a legal charge to the direct production of the order. However, we admit that in certain classes of work there is more chance of having defective work than in others, but we contend that this condition is one for consideration in the acceptance or rejection of an order and in the price consideration. Here will be found one of the applications of the use of costs with judgment —to know that certain work is more hazardous is to know that your expense rate will be affected to a greater or less degree by the amount of bad work made, and if comparisons are continually made of expense sheets the man responsible for the output will naturally be on the alert to exercise all precautionary measures to avoid these losses.

UNIFORM COST SYSTEM FOR JOBBING FOUNDRIES

TABLE OF ACCOUNTS

A PRODUCTIVE LABOR

1 All wages (day, piece, or premium) paid to the following when working directly upon production:
Molders
" Apprentices
Molding Machine Operators
Core Makers
" " Apprentices
Helpers or Laborers
Flask Fitters and Carpenters
Casting Cleaners

B METAL

2 . . lbs. Pig Iron charged into Cupola @ . . $. .
3 . . lbs. Bgt Scrap " " " . . . .
4 . . lbs. Fdy. " " " " . . . .
5 . . lbs. Total Melt ($. .
6 . . lbs. Fdy. Scrap Recovered @ . . $. .
7 . . lbs. Defec. Cstgs. cond., in Fdy . . . .
8 . . lbs. Total Scrap Recovered . . . .
9 (5—8) Gross Metal Used . .
10 . . lbs. Net Good Cstgs. (Inc. Corerods) . .
11 (9—10) Loss in Melting
12 (Value of 9 ÷ lbs. of 10) = Cost of metal per lb. of Good Castings.
13 . . lbs. Net Good Cstgs. exclusive of Core Rods, Replace and Foundry Castings

D PRODUCTIVE EXPENSES

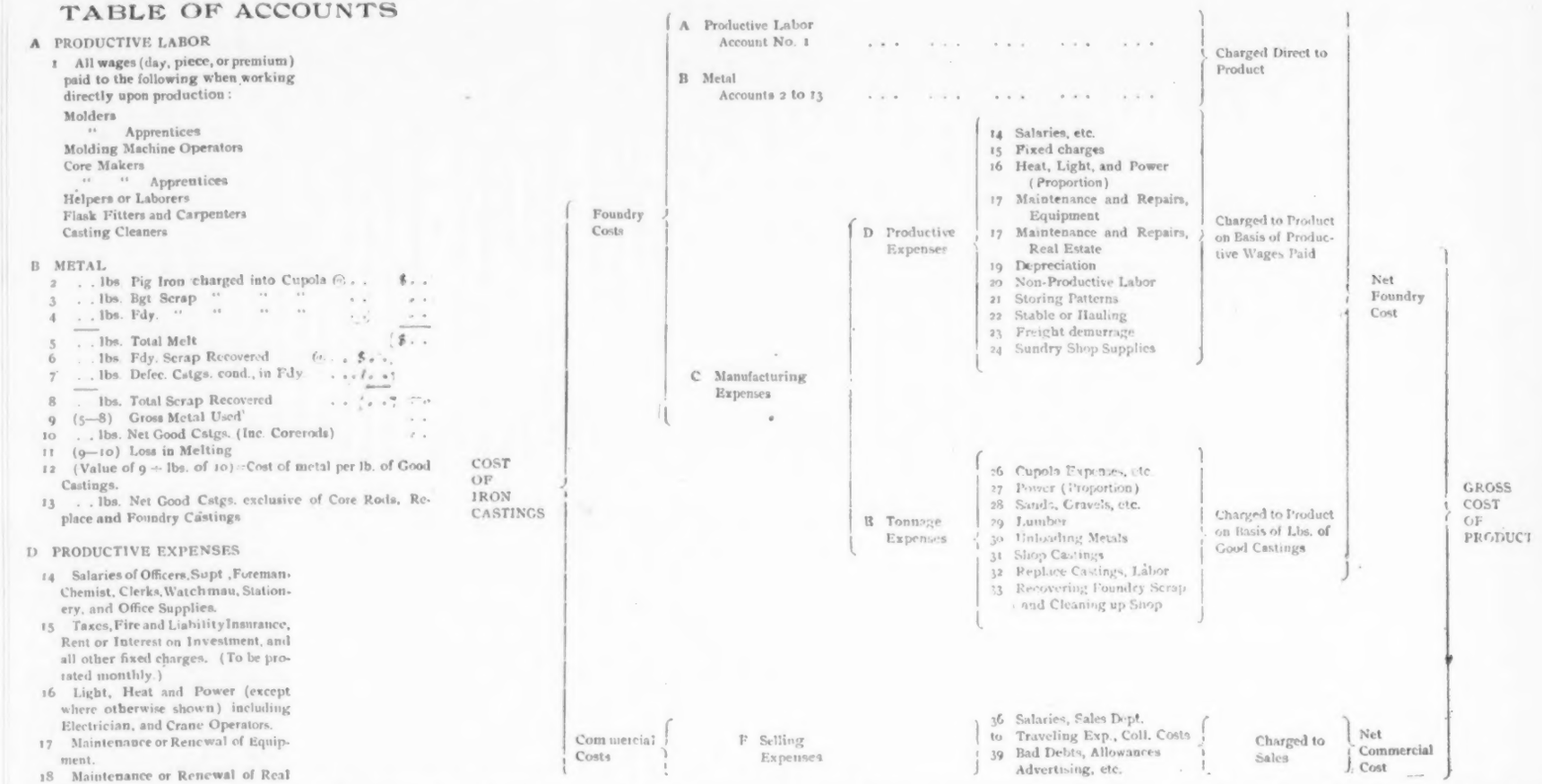
14 Salaries of Officers, Supt., Foreman, Chemist, Clerks, Watchman, Stationery, and Office Supplies.
15 Taxes, Fire and Liability Insurance, Rent or Interest on Investment, and all other fixed charges. (To be prorated monthly.)
16 Light, Heat and Power (except where otherwise shown) including Electrician, and Crane Operators.
17 Maintenance or Renewal of Equipment.
18 Maintenance or Renewal of Real Estate.
19 Depreciation of Real Estate and Equipment. (Pro rate monthly.)
20 Labor of Patt. Maker, Carpenter, Blacksmith, or all other organization labor not applied direct.
21 Storing and caring for patterns.
22 Stable or Hauling Expenses.
23 Freight demurrage.
24 Sundry Shop Supplies
25 Total Productive Expense.—
25 ÷ 1 = Productive Expense Rate to be applied to direct costs in proportion to amount of direct wages paid on each.

E TONNAGE EXPENSES

26 Cupola Expenses—Including all labor and material on Cupola, and Ladles, relining, charging stock, etc., together with Fuel for Melting.
27 Power—Proportion of power for blowers, elevators, rumblers, pneumatic or hydraulic service to be estimated on horse power basis or obtained by meter.
28 All Sands, Gravel, Facings, Coreroom Supplies, Chaplets, etc., Labor mixing facings and core sands, oven fuel, charcoal, etc.
29 Lumber for renewing or barring Flasks.
30 Unloading all materials, loading or charges on Refuse Dirt.
31 Labor and metal for shop castings, Jaggers, etc.
32 Labor on replace castings.
33 Recovering Foundry Scrap, Cleaning up Shop.
34 Total Tonnage Expense—
34 ÷ 9 (weight) = Ton. Exp. per lb. of good castings to be applied to direct costs in proportion to net wgt of good cstgs. in each.
35 Total Foundry Cost—
1 + 9 + 25 + 34.

F COMMERCIAL EXPENSES

36 Salaries of Sales Dept. or Commissions paid.
37 Traveling or Incidental Expenses
38 Advertising, Catalogs, and other printed matter.
39 Allowances, Cost of Collections, bad debts, Int. on borrowed money
40 Total Commercial Expenses—
To be distributed over sales.
41 Total Gross Costs—
35 + 40.


COST OF IRON CASTINGS
Foundry Costs
A Productive Labor Account No. 1
B Metal Accounts 2 to 13
Charged Direct to Product
C Manufacturing Expenses
D Productive Expenses
14 Salaries, etc.
15 Fixed charges
16 Heat, Light, and Power (Proportion)
17 Maintenance and Repairs, Equipment
17 Maintenance and Repairs, Real Estate
19 Depreciation
20 Non-Productive Labor
21 Storing Patterns
22 Stable or Hauling
23 Freight demurrage
24 Sundry Shop Supplies
Charged to Product on Basis of Productive Wages Paid
E Tonnage Expenses
26 Cupola Expenses, etc.
27 Power (Proportion)
28 Sands, Gravels, etc.
29 Lumber
30 Unloading Metals
31 Shop Castings
32 Replace Castings, Labor
33 Recovering Foundry Scrap and Cleaning up Shop
Charged to Product on Basis of Lbs. of Good Castings
Net Foundry Cost
GROSS COST OF PRODUCT
Commercial Costs
F Selling Expenses
36 Salaries, Sales Dept.
to Traveling Exp., Coll. Costs
39 Bad Debts, Allowances Advertising, etc.
Charged to Sales
Net Commercial Cost

Equipment.

All expenditures for additional standard equipment belong to capital account and are properly charged to it at cost value. All renewals to equipment are chargeable to Expenses (Productive), or if any equipment is abandoned or sold, capital account should be credited and expenses charged the full amount, less scrap or sales value.

Regarding special equipment for the production of any particular orders, such as loam plates, special flasks, bars, &c., the proper and only place to charge them is to the order for which they were made, crediting this order with their scrap value upon completion.

Stock cores should be considered a storeroom article, to be charged per piece as used, or if the character of work done is constant or approximately so, it could be considered as a portion of Tonnage Expenses and so prorated on all orders.

Subdivision of Various Details.

This system being elastic, it is capable of being divided and subdivided into many details, or of being condensed into few generalities. If it is found desirable to know the cost per pound or the cost per productive hour of the molding, coremaking, cleaning, &c., it can easily be done. If it is desirable to know how much per pound of net good

castings sold it has cost for any one of the numerous expense items, it can as readily be done and a careful compilation of these details for comparison from month to month will enable you to place your finger upon leaks or apparent wastes. It can be applied to each individual order or to various classes of castings and will be found elastic enough to cover any desired feature.

The attainment of costs does not effect any economy in current production, but it does directly affect profits by showing where losses have occurred either in the too expensive cost of production or too small amount received for the product, and is invaluable as a record for future guidance. With this system it is possible to discover just which of the various classes of work are profitable and which should either be raised in selling price or passed on to your competitor, and also to keep track of the efficiency of your men and organization.

Different foundries will have different ways of attending to the details of their business, and upon these details we do not presume to pass judgment, but merely present for their consideration this system which provides for the covering of all expenditures incident to the production of castings with the principal desire that ultimately, and if possible in the very near future, we may each and all realize what constitutes our costs, and in realizing have backbone enough to turn down an order which our judgment or records show would incur a loss. If this is accomplished and we compete for work, each will feel that the other is estimating upon the same work from the same standpoint of as nearly accurate costs as seems possible.

Estimating for New Work.

This is probably the most particular element in the management of our business, and the most particular element in estimation is to be sure that every item in the cost of production has been included.

We, in the foundry business, are compelled in strictly new work to rely upon the judgment of a guesser, sometimes good, sometimes bad. Where the same thing has been made before and the former cost is before you, it is somewhat simple, but even then, due to the fallibility of man, the cost may be incorrect and a careful examination of it should be made. "A good guesser is much more to be desired than a poor estimator," therefore particular attention should be given. We believe that the proper way to prepare an estimate is to have printed forms calling for every class of work or expenditure, the use of which would seem to make certainty doubly sure. In the use of expense ratio in estimating, judgment should be used in taking as a factor a rate which covered a period as nearly similar in conditions as possible, bearing also in mind the effect the proposed work might have upon the conditions then existing.

This paper, which I trust has presented to your minds a concrete, plausible and equitable system of cost accounting, will repay me for my efforts many times over if it shall chance to be the means of our getting closer together in the operations of our business. It will have done its duty if it is able to show you how necessary it is for you to know with some approximation of certainty just what it costs you to make all of your castings as a group or all as subdivided into classes or as further subdivided into individual items; and that in having this information we can all use it with the determination to make only those castings which will enable us to deal justly with our customers and ourselves, giving them low prices on low cost material and high prices on correspondingly high cost material and wipe out forever the apparently ever-present "hit or miss" custom which seems now to prevail.

The Cleveland Foundrymen's Association.

The annual meeting of the Cleveland Foundrymen's Association was held December 3. The election resulted in almost a complete change of officers, the following being chosen for the ensuing year: President, W. C. Bruce, Bowler Foundry Company; vice-president, E. A. Saeltzer, Loew Mfg. Company; treasurer, C. J. Snow, Macbeth Iron Company; secretary, Philip Frankel. The above officers, with W. D. Sayle, Cleveland Punch & Shear Works Company, and W. W. Balkwill, Cleveland Steel Castings Company, comprise the Board of Directors.

The association is flourishing, as indicated by the reports submitted by the officers. The treasurer's report showed a far better financial condition than at any previous time in the history of the association. Previous to the annual election the association took in five new members. The association decided to have its annual banquet some time in January. All the foundrymen in the city and others interested will be invited to the banquet. The association has had a committee at work for about a month endeavoring to formulate a uniform cost system. The committee has made considerable progress and will submit its report early next year.

The Philadelphia Foundrymen's Association.

The one hundred and seventy-second regular meeting of the Philadelphia Foundrymen's Association was held December 4 in the Manufacturers' Club, Broad and Walnut streets. Vice-President Alexander E. Outerbridge, Jr., occupied the chair. The meeting was largely attended, members being present from Philadelphia and a number of nearby points. Routine business was transacted, and the report of the treasurer showed the finances of the association to be in excellent shape. The committee appointed to attend the conference in connection with the proposed Atlantic deeper waterways made a brief report, at the conclusion of which a motion was passed that the Philadelphia Foundrymen's Association, as an association, apply for membership in the Atlantic Deeper Waterways Association, which has as its purpose the collection, preparation and presentation to Congress of information bearing upon the improvement and construction of inland waterways, particularly the improvement of rivers and harbors, which would form an integral part of such a line of waters from Massachusetts Bay to the Gulf of Mexico.

The Committee on Short Weight of Coal, Pig Iron and Coke, which was appointed to confer with a like committee of the New England Foundrymen's Association, reported that matters were progressing slowly, it being found that in Philadelphia territory the complaints of short weight in transportation were not so numerous as in some other sections of the country. The committee was instructed to continue its efforts to aid the New England Foundrymen's Association in its endeavor to have these matters adjusted. The nomination of officers for the ensuing year brought out the following:

President, Thomas Devlin, Thomas Devlin Mfg. Company, Philadelphia; vice-president, A. E. Outerbridge, Jr., Wm. Sellers & Co., Inc., Philadelphia; treasurer, Josiah Thompson, J. Thompson & Co., Philadelphia; secretary, Howard Evans, J. W. Paxson Company, Philadelphia. Executive Committee: E. E. Brown, E. E. Brown & Co., Philadelphia; Thomas M. Eynon, Eynon-Evans Mfg. Company, Philadelphia; H. L. Haldeman, Pulaski Iron Company, Philadelphia; George C. Davis, 39 South Tenth street, Philadelphia; James S. Stirling, Hilles & Jones Company, Wilmington, Del. Trustees: Thomas Devlin, president; Josiah Thompson, treasurer; Howard Evans, secretary. Official chemist, George C. Davis. These, with the exception of James S. Stirling of the Hilles & Jones Company, who is nominated to succeed W. O. Steele on the Executive Committee, are the present officers of the association. The annual meeting of the association will take place in January, when the election of officers will be held.

The paper before the association for the evening was on "A Uniform Cost System for Jobbing Foundries," by James S. Stirling, manager of the foundry department of the Hilles & Jones Company, Wilmington, Del., which will be found elsewhere in this issue of *The Iron Age*. This system is the result of two years' study and work on the part of the cost committees of both the jobbing founders and the American foundrymen's associations, the objects being first to obtain the cost of a casting, and, second, to sell it at a fair margin of profit. This system shows how the cost on products can be obtained either as a whole or subdivided in classes, and if followed out

will show the manufacturer just what proportion, if any, of his output is being made at a loss. The system is recommended as applicable to the small jobbing foundry as well as the larger ones and as capable of being adjusted to suit individual conditions with little or no difficulty. After a vote of thanks to Mr. Stirling the meeting adjourned.

The Independent Pneumatic Tool Company.

At the recent annual meeting of the stockholders of the Independent Pneumatic Tool Company, held at Jersey City, N. J., the following directors were re-elected for the ensuing year: James B. Brady, New York City; John P. Hopkins, Chicago; W. O. Jacquette, New York City; John D. Hurley, Chicago; James J. McCarthy, Chicago; John M. Glenn, Chicago; M. S. Rosenwald, Chicago; Simon Florsheim, Chicago; John R. Turner, Jersey City, N. J. At the subsequent annual meeting of the Board of Directors, held in Chicago, all of the former officers were re-elected, as follows: James B. Brady, president; W. O. Jequette, first vice-president; John D. Hurley, second vice-president; A. B. Holmes, secretary and treasurer. The annual statement of the company shows a very gratifying increase in business over the previous year. The plant at Aurora, Ill., has been much enlarged, and new machinery has been installed therein, furnishing facilities that will result in practically doubling the output. The statement also shows the company to be in excellent financial condition. The outlook for the coming year is regarded as promising, notwithstanding the general curtailment of business which has followed the financial upheaval. It is also stated that no order cancellations of consequence have been received from customers, nor has the company canceled any of its orders for steel and machinery. The belief is expressed that considerable improvement in business will take place early next year, after the financial flurry has subsided and confidence is restored.

At the recent annual meeting of the Utica Drop Forge & Tool Company, Utica, N. Y., the following officers were re-elected: William P. White, president; H. F. Kelleman, vice-president, and Hugh White, secretary and treasurer.

Estimating in the Foundry.

In the current issue of the *Associated Foundry Foremen's Review*, the secretary of the association, F. C. Everitt, of the J. L. Mott Iron Company, Trenton, N. J., contributes a paper in which foundry foremen are urged to provide themselves with some simple system for estimating, checking by actual costs and filing for convenient reference. The writer outlines a plan of this sort that is now in use with satisfactory results, and suggests that with some changes it may meet the conditions in other shops. The details of the system and the forms employed are given herewith:

ESTIMATE OF COST

Date _____ 190 _____ Dept. Est. No. _____

Fill in Items and Forward to _____ Dept. Estimated By _____

Specifications: _____

ITEMS OF COST	TOTAL LESS SHOP. EXP.	TOTAL WITH SH. EXP. ADDED

Estimate No. _____ Received by _____ Dept.

Date _____ 190 _____ Signed _____

This Sheet to be signed and returned to _____ Department at once

Fig. 1.—Form No. 1, Foundry Estimate Sheet.

When a request from a customer for a figure for some particular job is received the cost department issues on the foundry an application for an estimate to be submitted in accordance with specifications. The foundry estimate is then made out, giving the required details on Form 1, the original being sent to the cost department and a carbon copy retained and filed, together with all data made out for the benefit of the foundry department. When the estimate is submitted the stub at the bottom of the sheet is signed and returned to the foundry as a receipt.

If the order for these castings is received, a shop order bearing the estimate number and all necessary infor-

Form 252-2 M.—8, '07.

NAME _____ PAT. NO. _____

SPECIFICATIONS _____ SHEET NO. _____

_____ EST'E NO. _____

_____ PLATE NO. _____

MOLDER _____ FLOOR NO. _____

O. O. NO. _____ QUAN. ORD'D _____ (LABOR WAGES)

S. O. NO. _____ DATE ORD'D _____ D. W. PER DA. _____ HELP PER DA. _____

DEP'T _____ DATE IN SAND _____ " " HR. _____ " " HR. _____

DATE COMP'D _____ P. W. PRICE _____ " " PCE. _____

DATE																																				TOTAL LABOR	TOTAL MAT.
MADE																																					
BAD																																					
BROKEN																																					
MISSING																																					
GOOD																																					
TOTAL																																					
MATERIAL																																					
IRON LBS.																																					
@ PR. LB.																																					
CORES																																					
MOLDING																																					
TIME HRS.																																					
RATE																																					
TOTAL																																					
HELP																																					
TIME HRS.																																					
RATE																																					
TOTAL																																					
CLEANING																																					
CORES																																					
TIME HRS.																																					
RATE																																					
TOTAL																																					
WK'LY. AMT.																																					

COST CHECKED BY _____

(ORDERS _____ TO FOLLOW) _____

TOTAL MADE _____ LABOR ÷ _____ ESTIMATED WT. AND COST

" LOST _____ MATERIAL _____ WT. EACH _____ GAIN

" GOOD _____ TOTAL COST _____ LABOR ÷ _____

" WT. _____ COST EACH _____ MATERIAL _____

WT. EACH _____ " PER LB. _____ TOTAL COST _____

LOSS P. C. _____ COST EACH _____ LOSS

" PER LB. _____

LOSS P. C. _____

Fig. 2.—Form No. 2, Cost Sheet.

mation is issued on the foundry. It is very important that the estimate number be given so that it will be readily recognized as an estimated job, otherwise it might be easily overlooked.

As these shop orders are issued in duplicate, a copy is sent to the pattern storage, where duplicate tags are attached to the pattern and the job set aside ready for the sand. When put in the sand the molder retains one tag, and the duplicate, on which is marked the date and floor number, is immediately turned over to the foundry cost clerk. Form 2 is immediately filled out and the time put on the job. This sheet, on which is entered the estimated costs and weights, is good for four weeks' work, and when the job is completed the actual costs and weights are readily compared. After the first few castings are made the cost is figured as a check on the work.

In order to dispose of an undesirable accumulation of time cards, Form 2 has been introduced and has been found to be far more satisfactory. All records are contained on one sheet. If the time necessary to complete the job is more than four weeks, two or even three sheets can be used as the case may require. Besides being used for costs on estimated work, these sheets are of equal value in obtaining costs of new patterns and regular work, &c. To be brief, the form was drawn up so as to be as

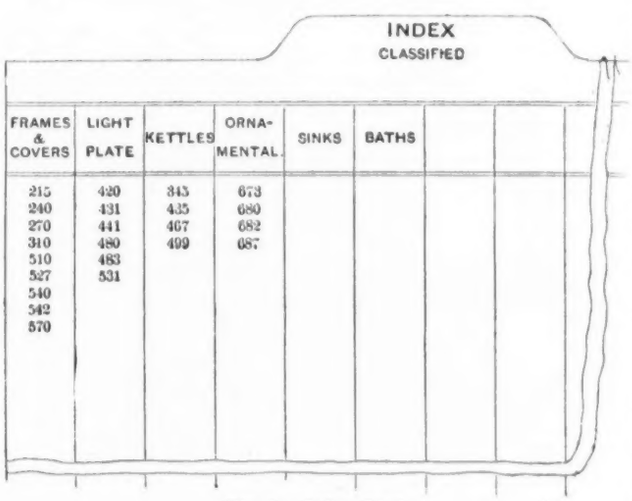


Fig. 3.—Index Card.

near universal in its application as possible, and is one that might be applied to advantage on general jobbing work. As the estimates are not received in numerical order it is necessary to remove the carbon copies from the book provided and file in some accessible form. The usual vertical filing system seems very well adapted to this work and affords a very convenient method of quickly locating the desired estimates, the estimates being filed numerically.

When making up an estimate it is well to look up the cost sheets, Form 2, of past records on a similar class of work. These costs will show whether previous estimates have been high or low and will greatly assist in estimating more closely and with greater accuracy than could possibly be the case if the foundry had no reliable data.

To locate readily a number of estimates under some particular class of castings, proper indexing is necessary. Several methods will be found available, any one of which may be applied. The first guide card in the drawer of a vertical filing cabinet is marked "Index," and one of the cards is shown in Fig. 3. The class of castings is entered at the head of the column and the estimate numbers are placed in the columns under their respective headings, thus making it very convenient to locate several estimates, with their costs, on any particular class of work previously recorded.

The plan as outlined above has been executed with as little labor as possible in an effort to obtain the most reliable information, and the results in many cases are surprising. The knowledge gained in carefully operating such a system is of great value, and will soon enable one to overcome the small expense of compiling such data, to say nothing of the satisfaction and confidence that may be experienced.

October Exports and Imports of Iron and Steel.

The October report of the Bureau of Statistics of the Department of Commerce and Labor presents results of our foreign trade in that month which are gratifying from the home viewpoint. Exports of iron and steel show a decided gain, while imports, on the other hand, fell off sharply. The total value of the exports of iron, steel and manufactures thereof, not including ore, for October was $18,951,198, against $16,830,833 in September. The value of the imports in October was $2,419,184, against $2,902,301 in September.

Taking the commodities for which quantities are given, the exports in October totaled 123,216 gross tons, against 115,869 tons in September, 118,944 tons in August, 121,400 tons in July, 92,529 tons in June, 91,513 tons in May and 132,332 tons in April. The following table gives details of the exports of these commodities for October and for the 10 months ending with October in 1907 and 1906:

Exports of Iron and Steel.

	October.		Ten months.	
	1907.	1906.	1907.	1906.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	4,306	5,046	64,556	65,463
Scrap	1,545	657	24,277	9,931
Bar iron	2,007	4,966	21,763	46,951
Wire rods	392	....	10,256	5,677
Steel bars	7,500	2,718	63,351	23,358
Billets, blooms, &c	5,840	10,170	66,133	180,632
Hoop, band, &c	375	792	6,231	4,169
Steel rails	34,753	22,732	288,002	273,010
Iron sheets and plates	3,565	2,758	32,074	13,264
Steel sheets and plates	6,549	8,926	70,490	77,409
Tin and terne plates	430	435	9,387	11,057
Structural iron and steel	15,587	9,569	117,774	93,460
Wire	15,973	17,877	132,298	144,170
Cut nails	722	794	5,739	6,754
Wire nails	2,874	3,780	37,695	41,608
All other nails, including tacks	822	664	6,629	4,369
Pipes and fittings	19,976	12,709	143,608	123,362
Totals	123,216	104,595	1,100,263	1,124,644

Turning to the imports, the quantity figures for October were only 21,223 gross tons, against 40,682 tons in September, 51,700 tons in August, 75,406 tons in July and 60,960 tons in June. The following table shows the details of the imports of these commodities for October and for the 10 months ending with October in 1907 and 1906:

Imports of Iron and Steel.

	October.		Ten months.	
	1907.	1906.	1907.	1906.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	9,893	35,789	459,040	265,665
Scrap	650	692	25,619	11,130
Bar iron	2,420	3,146	32,761	28,754
Rails	155	321	3,444	3,697
Hoop, band, &c	52	19	1,436	9,962
Billets, bars, &c., steel in forms n.e.s	1,579	2,091	13,044	17,067
Sheets and plates	206	256	3,204	2,886
Tin and terne plates	5,140	6,090	51,846	43,846
Wire rods	996	1,636	14,295	15,080
Structural iron and steel	132	921	2,159	26,625
Totals	21,223	50,961	606,848	424,712

The total value of the exports of iron, steel and manufactures thereof, not including ore, for the 10 months ending with October was $165,181,605, against $142,609,320 in the corresponding period of the previous year. The imports in the same time were, respectively, $34,117,204 and $27,784,650. The quantity of iron ore imported in the 10 months ending with October was 1,055,701 gross tons, while the exports for the same period were 224,021 tons.

The E. B. Van Wagner Mfg. Company, Syracuse, N. Y., recently incorporated, is manufacturing finished metal castings from a metal recently invented by Mr. Van Wagner. Charles Van Wagner, who is now with this company, was the organizer of the Metal Company of Syracuse, of which he has been the senior partner since its inception. The metal used has a great tensile strength and the castings are made by a patented machine, from which the company claims better results than any other machine it has used.

The Ernst Coal Charging Machine.

Patents have been granted to Alfred Ernst, Pittsburgh, Pa., on a coal charging machine designed for the purpose of labor and time saving in operating by-product coke ovens, as well as the so-called rectangular Belgian ovens lately introduced in the Connellsville region of Pennsylvania. In both systems the coal is at present charged through one or more holes on top of the ovens by means of coal larries provided with chutes and traversing rails on top of the ovens. The roof of the oven must therefore be constructed to withstand the vibration caused by the moving loads. After charging it can be observed that the top of the coal charge in the oven is of very irregular shape, as more coal will be deposited directly below the charging holes than in other places. The coal must therefore be leveled, and this is done by means of long bars introduced through the chuck hole in the door and operated by manual labor, or, as now generally adopted, by means of a leveling machine provided with a reciprocating leveling bar. In either case this operation takes considerable time and causes loss of gas and coke.

The Ernst coal charging machine introduces the coal through the side of the oven, and as no leveling is necessary, the process of coking the new charge can begin again one minute after the previous charge has been pushed out of the oven. The accompanying illustrations will explain the method of operation.

The machine consists of a rectangular box A resting on a carriage B, which travels in front of and parallel to the ovens. The box is provided with mechanism for hauling it into the oven—a motor and gears not shown in the illustrations. The drawing shows the box resting on rollers built in the frame of the machine and operated by a sprocket chain C driven by the motor and gears, to which the bottom plate D of the box is attached. On top of this bottom plate is a loose plate E, the rear end of which is provided with a lug F, to which a rope is attached winding over a drum, operated by a motor and gears located on the rear of the carriage. The front end of the loose plate is provided with a hole into which the pin G can be inserted. Attached to the plate E by means of the connecting link H, latch lever I, quadrant J and bracket K is an inclined sliding head L. The bottom of this head is provided with a projection fitting into the slot N of the plate E.

The operation is as follows: The coal is filled into the box from an overhead bin by means of suitable chutes and propelled to the oven to be charged. Fig. 1 shows the machine in position ready for operation. In Fig. 2 the box is in the oven. The loose plate E in the bottom of the box projects a short distance outside of the oven in order to insert the pin G in the hole in the end of the plate E, thus anchoring the plate. The box is pulled out of the oven by means of the sprocket chain, leaving the loose plate with the rear head and the coal in the oven. When the front end of the box in its backward stroke reaches the end of the oven a stop O fastened to the sides of the box presses against the latch lever, disengaging it from the quadrant and pulling the head with it into a position to enable the operator to close the front door of the oven. This door is then secured by means of a cross bar, the usual appliance for oven doors, the pin G is withdrawn and the loose plate is pulled out of the oven by means of the rope and drum, thus stripping the coal from the plate. The plate E in its backward motion and by means of the slot and the stop bar P attached to the rear end of the sides of the box pushes the head L into the original position. These operations connected with the withdrawal of the box are illustrated in Fig. 3.

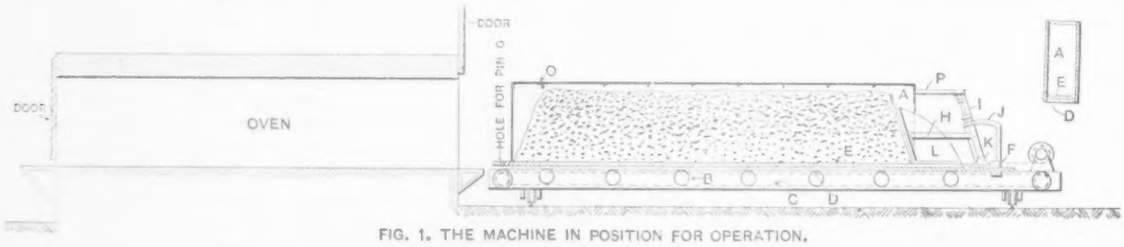


FIG. 1. THE MACHINE IN POSITION FOR OPERATION.

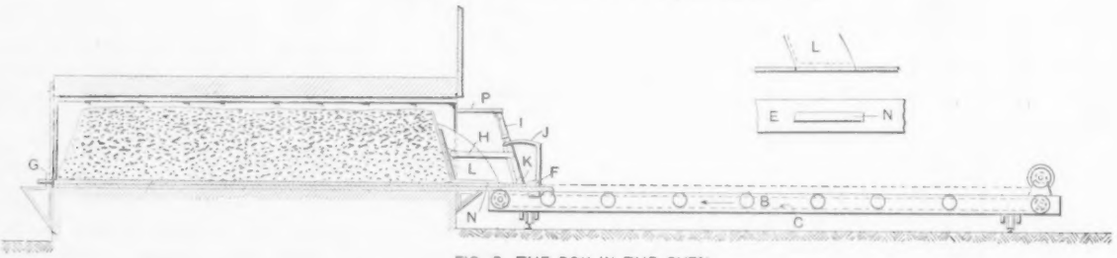


FIG. 2. THE BOX IN THE OVEN.

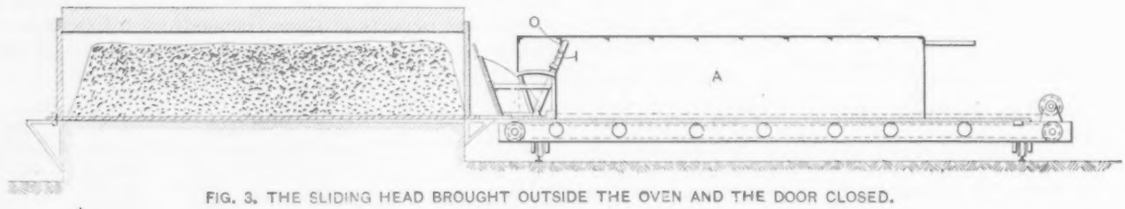


FIG. 3. THE SLIDING HEAD BROUGHT OUTSIDE THE OVEN AND THE DOOR CLOSED.

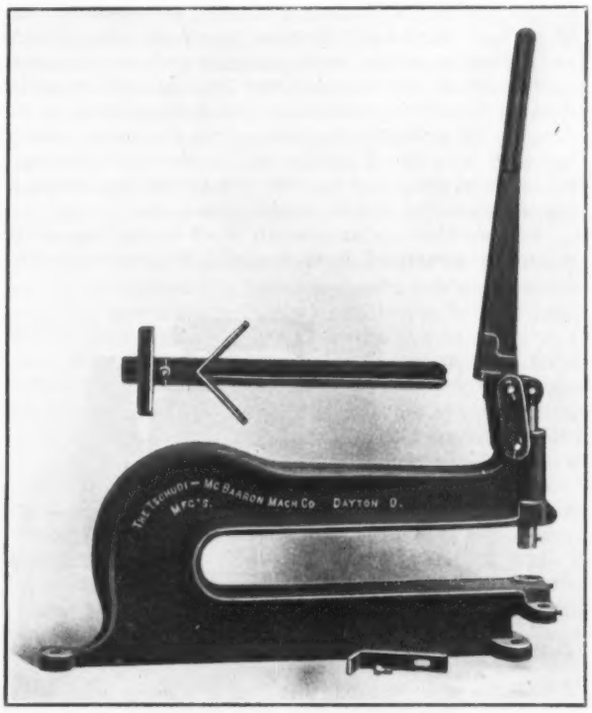
The Ernst Coal Charging Machine for Coke Ovens.

It can be seen that this method of charging does not require any additional labor, as the man who operates the coke pusher will also attend to the charging of coal into the oven. The machine can either be propelled along the pusher tracks by its own motive power or direct connected to the pusher, or moved along by means of a platform trailer connected to the pusher on which the machine itself can be run. The leveling operation is entirely eliminated as the top of the coal charge is already leveled when the box is introduced into the oven. The machine therefore takes the place of the larries and leveling machine, and thus abolishes the track on top of the ovens, besides shortening the time for both operations to a minimum. The Coal & Coke By-Products Company, Pittsburgh, has acquired all rights to put the Ernst machine on the market.

At the auction sale of the plant of the C. H. Hutchinson Foundry & Machine Company, Manchester, N. H., December 3, prices realized for the machinery were said to be satisfactory. Of the machinery and equipment, 510 lots were sold to 39 buyers from various cities in the East. The real estate was sold for $23,439.

The Excelsior Long Neck Hand Power Punch.

The unusually deep throat is a particularly noticeable feature of the Excelsior hand power punch press shown in the accompanying engraving, and made by the Tschudi-McBarron Machine Company, Dayton, Ohio. An exclusive feature which contributes much to the usefulness of the tool in sheet metal working plants is the gauge which is shown removed from the press in the illustration. It eliminates the necessity of marking duplicate work and the need of special skill in performing rapid and accurate work, so that a boy can usually be employed to operate it. It is very compact, and strong and powerful for its size, being capable of punching a ¼-in. hole through iron ¼-in. thick. The hight of the neck is 3½ in., and the length to the center of the die



The Excelsior Long Neck Hand Power Punch Press and Gauge, Made by the Tschudi-McBarron Machine Company, Dayton, Ohio

20 in. The body is 14 in. high, 5 in. wide and 30 in. long over all. The operating lever is 23 in. long. The ram is 11 in. long, 1¼ in. in diameter and has a stroke of 1½ in. The weight complete is 160 lb. Punches and dies up to ⅜ in. in diameter are furnished by the maker.

National Incorporation.—A national incorporation bill has been introduced in the United States Senate by Senator Platt of New York. It provides for the organization of a bureau of the Treasury Department to be known as the Bureau of Incorporation, having power to grant charters for corporations having a paid up capital of not less than $100,000 in excess of all bonds or floating indebtedness. The bill proposes to permit any corporation at present doing business in two or more States to surrender acts of incorporation taken out under the States and to reorganize under the national act. New corporations will organize under the national act if their business operations manifestly are to be carried on in two or more States. All such corporations are at all times to be subject to national supervision. Corporations organized under this act will be known as national companies or associations, and it is to be made unlawful to use the word "national," except where corporations are organized in accordance with this act or other acts of Congress.

If the bill now before Congress designed to procure the establishment of another navy yard on the Atlantic Coast results in the fulfillment of the plan, a determined effort will be made, it is said, to have the yard located on Narragansett Bay. The bill provides for the establishment of a commission of naval officers to select a site for a new navy yard and drydock, the intention being to provide accommodations for the largest ships in the navy.

The National Council of Commerce.

The National Council of Commerce, with a membership starting with about 34 organizations of business men in the large cities, and expected ultimately to embrace practically all the leading commercial bodies in the country, was formally launched at a conference in the office of Secretary of Commerce and Labor Straus, Washington, D. C., December 5. The meeting was attended by delegates of chambers of commerce, boards of trade and other organizations called together by Secretary Straus to promote closer association between the department and the commercial bodies of the United States.

Gustav H. Schwab of New York was made chairman, Frank W. Wiberg of Cincinnati was appointed secretary, committees were appointed to perfect organization, and much progress was made in carrying out a scheme presented by Mr. Straus which he characterized as a tentative one for the condiseration of the delegates. Before adjournment two committees, those on organizations and rules, made their report and the scheme suggested by Mr. Straus was adopted.

The scheme prescribes that the council's functions shall be to keep the Department of Commerce and Labor informed of the needs and desires of the business world as formulated by responsible commercial and industrial organizations, representing manufacture, internal trade, and foreign commerce, both export and import, and possibly transportation, and also to keep the business community informed regarding the work of department, its plans, methods and results.

The organization will consist of two closely connected yet distinct bodies, a National Council of Commerce and an Advisory Committee, each to elect its own officers and establish its own rules of procedure. Committees were appointed by the chairman as follows:

Organization: Gustav H. Schwab, New York, chairman; H. E. Miles, Racine, Wis., National Association of Manufacturers; Mahlon N. Kline, Philadelphia, Philadelphia Trades League; George F. Stone, Chicago, Board of Trade; D. A. Tompkins, Charlotte, N. C., National Association of Manufacturers; H. Mosle, Galveston, Texas, Chamber of Commerce; Henry W. Peabody, Boston, National Board of Trade; Senator George C. Perkins, California, Chamber of Commerce of San Francisco; William P. Kennett, St. Louis, Mo., Merchants' Exchange; Francis B. Loomis, Cincinnati, Ohio, Chamber of Commerce.

Rules: Frank D. Lanne, Philadelphia, National Board of Trade; I. H. Cowen, Fort Worth, Texas, American National Live Stock Association; B. A. Eckhardt, Chicago, Board of Trade; I. W. Pope, Atlanta, Ga., Chamber of Commerce; G. D. Rogers, Minneapolis, Minn., Chamber of Commerce.

An Advisory Committee of 15 will have headquarters in Washington and will meet four times a year or oftener. The Council will meet annually or may hold special meetings.

President Roosevelt received the delegates in his office and emphasized the benefit and importance of having the commercial bodies of the country connected in some manner officially with the Government.

The Quicksilver Production in 1906.—The production of quicksilver in the United States in 1906, according to the United States Geological Survey, was 26,238 flasks of 75 lb. each, valued at $958,634, as compared with 30,451 flasks, valued at $1,103,120 in 1905, a decrease in quantity of 4213 flasks and in value of $144,486. Of the total product, California furnished 20,310 flasks, valued at $730,808; Texas, 4761 flasks, valued at $178,829; Utah, 1164 flasks, valued at $48,888, and Oregon, three flasks, valued at $109. The decrease was due to the falling off of more than 4000 flasks in the output of the California mines. The Texas producers made a small gain and those of Utah a somewhat greater one. The domestic production nearly equaled the domestic consumption and exports decreased considerably.

A Combination Foot or Belt Power Press.

A small quick acting punch press for the manufacture of light sheet metal and brass goods has been designed and put on the market by the Automatic Specialty Company, Sixth and Baymiller streets, Cincinnati, Ohio. It is shown in the accompanying illustration, and as indicated is a combination foot power and belt driven press. As a foot power machine it is adapted for the use of tinners, stove and cornice makers or any class of manufacture where foot power is the only motive power available or where a press is not in constant operation. As a belt driven flywheel press the machine is conspicuous for its power and durability in relation to the weight of the machine. The regular punch press is constructed to take any size punch up to and including ⅞ in. in diameter, and to punch readily a hole of the maximum size through ⅛-in. thick brass or soft iron. It is designed, also, so that all parts are easy of access and that the changes from one size punch to another or from belt power to foot power can be accomplished in a few moments. When

A Combination Punch and Die Press for Foot Power or Belt Drive, Built by the Automatic Specialty Company, Cincinnati, Ohio.

being used as a foot press the treadle beneath the machine is connected with a crank pin on the flywheel, which is revolved by the foot of the operator in this way. The slide or arm of the press is fitted with an adjustable gib to take up such wear as may occur. The bolster plate on the regular machine is fitted with a front and side gauge for guiding stock to the punch where duplicate pieces are wanted. The machine weighs 500 lb. The distance back from the center of the slide is 5¾ in., the distance from the bed to the bottom of the slide when up is 4½ in., and the stroke is ¾ in. The floor space required is 19 x 28½ in., and the hight from the floor to the center of the flywheel is 50 in.

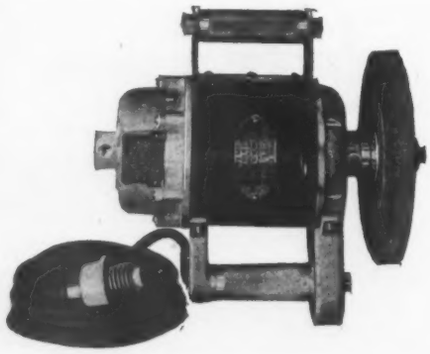
The German Steel Syndicate, according to a press cablegram from Berlin, dated December 4, has decided to reduce, on January 1, the price of structural shapes and steel billets by $2.50 a ton. This step is significant, as it is the first reduction made by the syndicate for the home market since the current reaction in trade began.

The Cincinnati Portable Grinder and Buffer.

Of special service in machine shops and foundries for grinding castings, &c., is the new portable electric grinding and buffing machine made by the Cincinnati Electrical Tool Company, Cincinnati, Ohio. The operating and controlling switch is located in the lower handle of the machine, as it appears in the illustration. This is the one which the operator grasps with his right hand, and it is not necessary for him to release his hold on the machine when starting and stopping. The bearings are of phosphor bronze, are arranged for convenient lubrication and are provided with dustproof oilers. The machine is air cooled by a rotary fan mounted directly on the armature shaft. The machine is furnished with an emery wheel 8 in. in diameter by ¾ in. face, which is interchangeable with a buffing wheel or a special shaped emery wheel.

The machine when used as a buffer is especially useful in garages, engine and dynamo rooms, &c., for polishing and buffing up bright parts. Another and very important application of this machine and one that will appeal to diemakers in sheet metal and drop forging shops, is that dies can be ground while they are in the press, dispensing with the time of taking out the dies and grinding in the ordinary way, and the resetting of the punch and die, which means the loss of considerable time.

The machine has an eye-bolt fitted on the top, so that it can be suspended from a spring or provided with a



A Portable Metal Grinding and Buffing Machine Made by the Cincinnati Electrical Tool Company.

cord and counterbalance, relieving the operator of the weight if so desired. The machine weighs 25 lb. complete, and is regularly furnished for 110, 220 or 500 volt direct current, or can be wound for any special voltage from 75 to 650. The standard equipment includes a 10-ft. attaching cord, and power is taken from an ordinary lamp socket. The machines are carefully designed and balanced, and are rigidly inspected and tested before shipment.

The Carnegie Veterans.—The sixth annual meeting and dinner of the Carnegie Veteran Association was held at the home of Andrew Carnegie in New York City, Friday, December 6. Thirty-seven members were present and 10 were absent. One death has occurred in the past year, that of Homer J. Lindsay. The speakers at the dinner were Mr. Carnegie, W. E. Corey, C. M. Schwab, J. H. Reed, W. B. Dickson, James Gayley, J. J. Campbell and J. G. A. Leishman, United States Minister to Turkey. The officers were re-elected as follows: Andrew Carnegie, president; C. M. Schwab, vice-president; C. L. Taylor, secretary and treasurer; W. B. Dickson, poet laureate.

The Bury Compressor Company, Erie, Pa., has recently received an order from the Imperial Japanese Navy for one 350-ft. belt driven air compressor, and from the Navy Department of France a direct connected motor driven air compressor. The company has recently shipped the Brooklyn navy yard a steam driven type of air compressor for the United States ship Panther, which is to sail with the Pacific squadron.

Intermediate Freight Rates.

BY R. L. ARDREY.

The Interstate Commerce Commission has given the shippers of the country a new consignment of trouble by a ruling, announced in special circular No. 5, which invalidates "intermediate" rates unless the railroads, prior to December 31, 1907, issue supplements to all tariffs containing these rates which will state them in a more specific manner than heretofore. This ruling is of great importance to all shippers or buyers of iron and steel and other products which are shipped on commodity rates.

Commodity tariffs seldom give the names of all the stations to which they apply. A tariff on pig iron from Pittsburgh or Birmingham to New England over any line usually mentions only the important cities; often only the points along the line where the rate changes to a higher figure. The intermediate stations or towns take the rate of the nearest point beyond. No station in New England on a line between Pittsburgh and Boston would pay more than the Boston rate. This plan of omitting the intermediate stations saves the railroads a vast amount of paper, printing and labor in compiling tariffs, and shippers and the public lose nothing by it. All commodity tariffs—on coal, coke, iron, steel, lumber and a multitude of other articles taking such rates—have been built up on this system.

The commission is not satisfied with the phraseology generally employed by the railroads in making these rates apply to intermediate points. Apparently without inquiring as to the number of such tariffs now in force, or the time the railroads would require to change them all, the commission has issued a peremptory ruling that they must be amended or reissued before December 31, during which time the new supplements or reissues may become effective on one day's notice. After December 31 they will take the regular course, not becoming effective until 30 days after they are filed with the Commission. It will probably take the railroads a year, perhaps two years, to overhaul their commodity tariffs and comply with the new standard which the Commission has established. Meantime there is likely to be a great deal of confusion and injustice, unless the Commission modifies its order and allows more time, or unless the railroads practically ignore it.

Class Rates Will Then Apply.

Thousands of industries, using iron and steel and other materials, are located in towns that are not specifically named in the tariffs on which they receive their stock, and the tariffs now in force cover these intermediate stations in a manner which the Commission proposes to make unlawful. There are class rates in force everywhere, between every railroad station and every other station in the United States, and wherever a commodity rate is cancelled or declared illegal the class rate comes automatically into effect and becomes the lawful rate.

Class rates, however, are all the way from 50 to 500 per cent. higher than commodity rates. They are the general rates of railroads, applying to merchandise like finished hardware and other products intended for general consumption. Industries which use heavy or bulky materials could not exist if they were dependent upon class rates. To promote the growth of industries, and thus expand their own traffic and increase their earnings, the railroads have universally established commodity rates for raw materials and in many cases for heavy finished products whose movement would be restricted by excessive class rates. The wisdom of this policy in building up industries is shown by the fact that the coal and iron roads are the most prosperous railroads in the United States, and while they make low rates on these commodities, they usually show the lowest ratio of "cost of conducting transportation" in proportion to their gross earnings.

If the railroads ignore this ruling they will have trouble with the Commission. If they attempt to enforce class rates against thousands of industries which have heretofore had commodity rates, but which will not be entitled to them under this ruling, they will have more trouble with the shippers of the country. The probabilities are that they will not cut off the large shippers from commodity rates, keeping their old tariffs until they can get around to revise them, but the small shipper may not fare so well. Many manufactured products of iron and steel are distributed throughout the country on commodity rates, and when the buyer finds his freight bill two or three times as high as in former years he will be informed that it was caused by the Interstate Commerce Commission.

The Long and Short Haul Clause.

Section 4 of the original Interstate Commerce act is supposed to be still in effect. It has not been repealed by Congress, and the Commission only has power to suspend it in specific cases, such as on rates to the Pacific Coast, which are lower than rates to intermediate points. This clause makes it unlawful for the railroads to charge or receive "any greater compensation in the aggregate . . . under substantially similar circumstances and conditions, for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance; but this shall not be construed as authorizing any common carrier within the terms of this act to charge and receive as great compensation for a shorter as for a longer distance."

Until recently it was the general custom of railroads to print on the face of tariffs a notice to the public and to their own employees, which was usually worded as follows: "Agents are strictly prohibited from quoting or using a higher rate for a shorter than for a longer distance on interstate traffic over the same line in the same direction, the shorter being entirely included within the longer distance." During the past year, however, most of the roads have dropped this notice from their tariffs, and traffic questions are becoming so confused that many cases are arising where the plain language of the long and short haul clause is not followed.

There is a growing sentiment among railroad men in favor of ignoring this long and short haul rule on commodity tariffs. Many important cases have arisen which show the drift of events. For example, a mill receives an emergency order for steel from some point in the West which is not mentioned in commodity tariffs. There is a rate to a junction point a few miles beyond, and the shipment would have to go through the buyer's town to reach this junction. The railroad refuses to apply the commodity rate to this intermediate point, claiming it would be contrary to rulings of the Commission to do so; the Commission refuses to enforce the long and short haul clause, and the buyer cannot wait 30 days for the road to file a new tariff mentioning specifically his town.

Important for Shippers to Verify Rates.

The most exasperating cases will arise where neither the shipper nor the consignee knows about this new ruling of the Commission or takes pains to verify the rate before the shipment goes forward. The consignee cannot get possession of the goods until he pays the rate at which the car is billed, and he will then have an interesting job on his hands in trying to get the railroad to refund what he considers an overcharge. The claim agent of the railroad will get an opinion from the legal department that it would be unlawful to make the refund, because the shipment was billed at the "lawful" rate. Every shipper knows how careful the roads have become about refunding any money contrary to the rulings of the commission.

Until this matter is cleared up it will be very important for every manufacturer who ships his product out over the country at commodity rates to verify the rate carefully before the car goes forward. This applies particularly to cases where the buyer only takes a car or two a year. The commodity rates that have been in force heretofore may not apply, unless the railroad agrees to protect them before accepting the shipment. It is true that such promises or agreements to protect rates are not legally binding on the roads, but they establish a moral obligation which will make it easier to get an overcharge corrected.

The Wetherill Finished Castings Company, Philadelphia, Pa., announces the removal of its factory and office to Erie avenue, east of Richmond street.

THE MECHANICAL ENGINEERS' CONVENTION.

The preceding issue of *The Iron Age* contained an account of the opening of the twenty-eighth annual meeting of the American Society of Mechanical Engineers in New York City on Tuesday evening, December 3, and a *résumé* of President F. R. Hutton's address on "The Mechanical Engineer and the Function of the Engineering Society." As stated in the report referred to, this was the first general meeting of the society in the Engineering Societies Building at 29 West Thirty-ninth street, and all of the succeeding sessions were held in that building. It was expected that the attendance would be very large, and so it proved, the final registration being 1320 members and guests.

THE SECOND SESSION.

As usual, the second session convened at 9.30 Wednesday morning, and was first given to the consideration of business matters and announcements. The remainder of the morning was to have been occupied with the presentation and discussion of the papers scheduled, but time allowed, however, only for the first paper.

"The Rational Utilization of Low Grade Fuels in Gas Producers."

By F. E. Junge, Berlin, Germany.
Member Verein Deutscher Ingenieure.

This paper treated of the economic importance of utilizing lignite and peat deposits and low grade fuels and how they can be used most efficiently, giving special consideration to the employment of gas producers. In Germany the art of utilizing inferior fuels has been more highly developed than elsewhere, and frequent allusions were made to the practices in that country. Referring to the effect of ash, moisture and volatile contents in fuels, the author stated that high percentages of the two former do not preclude the use of such fuels in gas producers, even though they may be undesirable or impossible of use under boilers. By-product coke making from lignite and peat is a relatively new process in Germany which promises commercial success. The utilization of peat apparently finds its only economical solution in gas producers where the by-products play an especially important part in the value of the process. The paper further offered recommendations for the utilization of mine culm, wash banks, coke breeze, dust coke, &c. The author's conclusions were in part as follows:

"The rational utilization of coals of high volatile contents requires the adoption of gas producers with by-product recovery and the distribution of heat, light and power from gas driven central stations to the neighboring districts, a scheme which is feasible only when operating on a large scale and where staple markets for the disposal of goods lie within the commercial distribution radius of the plant. Fuels of high ash contents, on the other hand, such as mine culm and other waste of low heat value, must be used at the spot in producers specially equipped for the purpose. Dust coals and similar fuels can either be gasified in producers particularly designed for their use, or they may be transformed into briquettes, whereupon competition becomes possible with the best grades of coal for all manner of application. In all cases the employment, in the electric central station, of large gas engines is a logical supplement to the gasification of coal in producers and is the only means, so far available, for attaining maximum industrial economy in the operation of plants of some magnitude."

In discussing this paper Prof. Robert H. Fernald of Washington University, who is in charge of the gas producer division of the United States Geological Survey fuel testing plant, gave an account of the investigations, which have been made by the Government, in so far as they bear on the subject of this paper. R. E. Mathot of Brussels, Belgium, gave an interesting description of a device for determining the state of combustion in gas engines by analyzing the exhaust gas. A section of the apparatus was drawn on the blackboard and its operation described. It consists of a flask through which the gas is aspirated, passing through a mercury seal, and is allowed to escape from the flask after contacting with a disk of treated paper, the discoloration of which indicates the presence of unconsumed gas. Prof. C. E. Lucke, Columbia University, declared that what had not been brought out and is important to engineers is that gasification of low grade fuels is not a commercial proposition to-day. Such a plant if at all available would be too expensive, and the labor to operate it would be too excessive. A third and most important reason why such a plant would not be commercially successful is that operation at present is limited in the length of run before cleaning is necessary by the fuel used, and that low grade fuels would entail a too frequent cleaning. The problem, as Mr. Lucke sees it, is how to reduce first cost and labor cost, and how to render operations continuous. When these are solved the commercial success will be attained, as the speaker thinks it will eventually. J. R. Bibbins, Pittsburgh, cited experiments made in that city at the solicitation of a mine operator, who desired to market his low grade and small coal by generating current at the mine and distributing it instead of selling the low grade coal direct. The mixtures tested were rice, barley and buckwheat and culm, and an anthracite producer was used which was not specially fitted for this coal. A slightly higher blast was used and a lower depth of fuel bed than customary. Culm was abandoned because it would pack, being practically dust. The speaker's conclusions were that with careful operation a rice and barley mixture as it comes from the breaker would give as good satisfaction as pea anthracite. He believed that commensurable results could not be obtained under steam boilers judging from the results of tests. Hand firing is necessary, there is less capacity for forcing, and it seems conservative to limit boilers to No. 2 buckwheat, and below this size to use the coal in producers. He also urged that it is important to have a correct knowledge of the sizes of coal for producer work. He disagreed with all of Professor Lucke's disparagements of producers for low grade fuels. Prof. William Kent, Syracuse, approved the work of such men as Junge, and indorsed Professor Lucke's opinions of the use of low grade fuels in producers. He gave his reasons for believing that the steam engine will hold its own for some time. He believes that the combination of boilers with automatic coal delivery, steam turbines, &c., gives as fine a result as can be wished for, and that the day of gas engines is postponed. Another speaker supported Mr. Bibbins in his criticism of Professor Lucke, and mentioned that lower cost of fuel usable in producers and not suitable in boilers gives producers the economical advantage. L. R. Pomeroy, New York, spoke with reference to the utilization of lignite coal. In the Northwest lignite exists where water is not fitted for boilers, and the use of such fuel in producers would be an advantage.

The next paper of the morning was on

"The Apprentice System of the New York Central Lines."

By W. B. Russell, New York.

The paper described a comprehensive apprentice system which includes special shop instruction, carried on in the regular shop where the boy is under actual shop conditions, shop discipline and shop environment. Combined with this training, educational classes are held during working hours, using courses of study, intensely practical in character and outlined to illustrate, explain and supplement the work in the shop by simple and direct methods, suited to the needs of the apprentice. The scheme starts at the bottom and is designed to increase the efficiency of the rank and file of mechanics. It is expected that exceptionally bright boys will profit most by the training offered and thus provide the necessary leaders. This plan is directed toward a broad and well constructed foundation of intelligent, thoughtful shop workers. The genius is left to reveal himself. The plan is now working, and working well, under a central leadership and providing for widely varying conditions in nine different places. It may not be, and probably is not, perfect, but it has proved capable of meeting a specific need with great promise for the future. It seems equally well adapted to small as well as large organizations, is applicable to almost any branch of manufacturing or repair work, and can be installed in most shops with talent already employed.

In discussing this paper, H. L. Gantt, Pawtucket, R. I., believed that the scheme outlined was one bound to produce good results. He explained his own methods in such work, and declared that the result he had obtained was a crop of good foremen. He believed Mr. Russell's scheme to be applicable to special cases only, whereas his own is suitable to any shop. He sums the purpose in the words, "Teach the people that you have got, to do what you want them to." A discussion sub-

mitted by A. L. Rice, Chicago, considered that the most important thing necessary is to arouse interest in practical problems, and that apprentices should be taught to read the trade journals in their line. W. J. Count in general approved the scheme outlined by Mr. Russell, and criticised only that it implied too much specialization. In his opinion the object should be a man as the product and not a machine. He believed that best results can be obtained by putting the man in competition with himself. He described the present tendency to take away the ideal or the factor of inspiration from the individual, and qualified the work being done by the New York Central as philanthropic and magnificent. He believed that the important need is to do away with the feeling men now have that they do not have a fair show, and urged that their loyalty be encouraged. Prof. A. L. Willison, Pratt Institute, Brooklyn, N. Y., commented on the paper and emphasized principally its good features.

At this point it was necessary to adjourn the meeting, the discussion to be continued on Thursday morning.

WEDNESDAY AFTERNOON EXCURSION.

Wednesday afternoon a large party took advantage of the opportunity to pass through and inspect the first completed tunnel of the McAdoo series under the Hudson River as guests of the engineer in charge, Charles M. Jacobs.

THIRD SESSION.

GAS POWER SECTION.

Continuing Thursday morning the discussion of Mr. Russell's paper, F. E. Rogers, New York, read a written discussion from Oscar E. Perrigo, Peabody, Mass., which outlined suggestions for elaborating on the details of a successful educational system for workmen. H. F. J. Porter regarded the paper as an appeal for the education of managers to a realization of the need of developing the efficiency of their employees. He suggested that perhaps the psychological moment had arrived to start an American Society of Industrial Managers, which has been proposed before, to establish a platform for the presentation and discussion of those business principles which are found to be sound and sane. George W. Rink drew attention to the opportunities of studying drafting and elementary mechanics afforded by correspondence schools and free evening schools. Still, there are those who cannot avail themselves of these opportunities and many mechanics cannot read drawings. He was speaking principally of railroad work, and referred to a school established by the Central Railroad of New Jersey to instruct its employees in shop work. The apprentices throughout their four years are required to attend this school three times a week for 10 months in each year. The speaker is in charge of this school. It recruits men from the shop for positions of foremen and designers by developing those who show the most aptitude. C. W. Cross, who is in charge of one of the New York Central schools, further commented on the work. Mechanical drawing, he stated, is the background of the course, as explained by Mr. Russell, and he confirmed the success of the system adopted by the New York Central. L. D. Burlingame, Providence, R. I., believed not so much in trying to make managers and foremen of the men, but in developing them into expert workmen, drawing from those who would otherwise be unskilled workmen or laborers. Mr. Russell, in closing the discussion of his paper, took exception to Mr. Gantt's comment that his plan is applicable only to rich companies or special conditions. He agreed that different details may be necessary to make boilermakers from those to make machinists, but that in general the plan may be the same. He further declared that the scheme was not a philanthropic one but purely a business proposition. By maintaining several shops and schools there is created a competition which arouses the enthusiasm of the individual. He indorsed the suggestion made by Mr. Porter that a national association of business or industrial managers be formed. At this point the president referred to the Society for Promotion of Industrial Education, which is doing a great deal of work along this line.

Continuing the discussion of the first paper presented Wednesday morning by Mr. Junge, Professor Fernald illustrated with lantern slides graphic charts bearing on producer gas work. He declared that producer gas power installations more than doubled during the last year—there are 400 now where a year ago there were only 150—and that the aggregate horsepower now is 13,000. About 70 per cent. of this horsepower is generated from bituminous coal; while in point of number anthracite plants form 80 per cent., they represent only 30 per cent. of the total horsepower capacity. From a large series of tests it has been deduced that the total efficiency of a gas plant as compared to that of a steam plant is in the proportion of about 2¾ to 1. Some of the coals tested by the Geological Survey could not be used in boilers, but could be in producers. He also gave a table comparing various coals, and mentioned these tests to show that the Government is using low grade fuels satisfactorily. While these tests may not be regarded as commercial, in one sense, they do promise commercial results. This in spite of the fact that the producer used was designed for anthracite coal. As of interest in connection with the relative efficiency of steam engines and gas engines, R. E. Mathot gave the figures from a semi-portable engine using superheated steam, showing exceedingly good results. E. J. Kunze discussed boiler furnaces and grates in particular in comparison with gas producers, and gave his opinions on how to prevent clinker formation in producers. Rolof Klein declared it to be perfectly possible to figure out in any case just what is the most desirable, a gas or a steam plant, and gave an approximate comparison of the cost of the constituent parts in a 2000-kw. plant of each type. H. H. Supplee confirmed the high efficiency figures of the Wolf engine, which had been mentioned by Mr. Mathot, and gave as the reason, that the transmission distance of the steam is short, and the superheated steam does not, therefore, have a chance to lose its high heat. In his opinion a superheated steam engine should be regarded somewhat as a mean between a gas and an ordinary steam engine. Interesting figures of the excellent performance of the steam turbines in the Commonwealth Edison Company's Fisk street station in Chicago were given by Prof. L. C. Breckenridge, for which very fine water rates were reported.

At this point an appeal was made to the members by Past President J. M. Dodge, a member of the committee to raise the fund for paying off the societies' part in the cost of the land on which the Engineering Societies' Building is erected. At the present time there has been subscribed about one-half of that necessary, and active measures are to be taken to induce the membership to respond in order that the full amount may be speedily raised and the interest on the indebtedness saved.

Duty Test on Gas Power Plant.

BY J. R. BIBBINS AND G. I. ALDEN, PITTSBURGH, PA.

The test reported in the paper was made on the gas power plant installed at the Norton Company, Worcester, Mass., and represented an effort to throw some light upon the question of the general character of service and average operating efficiency attainable from a modern bituminous producer gas power plant, and whether the high efficiency claimed for it is maintained in commercial service. It was treated from the practical, rather than the scientific standpoint, although the methods employed were as accurate as possible in a field test.

Discussing it, Prof. S. A. Reeve, New Haven, Conn., commented at some length on what may be regarded as producer characteristics, and asked some questions of the author of the paper. W. D. Ennis, Schenectady, N. Y., presented curves of three tests of coal consumption, and reported a gain of about 4 per cent. between the coal consumed and the buss bar in a gas plant, as compared to a steam plant. Professor Kent asked whether it was a service test or an efficiency test that had been made by the author, and wanted to know how the efficiency could have been made better. In closing the discussion, the author explained how he figured out the efficiency beyond the range covered in his paper, and stated that the test was a service test and not an efficiency test. He didn't know exactly how the efficiency might have been improved, but thought that a 2 per cent. better efficiency would be entirely possible.

Announcements were then made with regard to the reception on Thursday evening, and attention was turned to a consideration of the following paper:

Control of Internal Combustion in Gas Engines."

BY PROF. C. E. LUCKE, COLUMBIA UNIVERSITY.

This paper was an examination into the conditions under which constancy of effort may or may not be obtained with constancy of setting of the governor and valve gear. Differences as shown by indicator cards are almost entirely due to variations in the combustion lines, and such variations are attributable to preignition, mixture effect and the phenomenon of the explosive wave. Experiments by Dr. K. J. Falk on the temperature of ignition of explosive mixtures, controvert the former belief that the percentage of hydrogen is necessarily responsible for the ignition temperature, and indicate that the percentage of inert gas more truly determines the condition of ignition. The temperatures given for various definite mixtures seem to follow a law which was deduced, but all are above those which would be effected by compression in a gas engine unless the internal temperature were unusually high, so that the heated parts or projections in the cylinder appear to be the real causes of preignition. For controlling preignition the author recommended: "Maintenance of proportion of the elements of the mixture to those having the higher temperature of ignition, provided this mixture will still contain enough oxygen to burn all the fuel present; care in securing as low an initial temperature of the mixture as possible by maintaining inlet passages cool and purging the cylinder as completely as possible of burnt gases (this also involves the maintenance of early ignition to reduce final release temperatures); and care in designing the machine so that interior parts shall be as well cooled as possible. It seems to be impossible to entirely prevent explosive waves in the engine cylinder, but they can be practically eliminated by proper form of the combustion chamber and a method of igniting that avoids generating successive waves. The maintenance of uniform cylinder mixtures appears to be physically impossible in present types of engines."

Discussing this paper E. J. Kunze, Newark, N. J., analyzed the influences which have to bear on each of the three factors in the operation of a gas engine, which must be taken into consideration in procuring the required regulation, and gave opinions with regard to obtaining the desired results. It had been pointed out that part of what might have been taken to be explosive wave effects could have been caused by the inertia effect in the indicator. R. E. Mathot described an indicator fixture, which he had used himself for eliminating the inertia effect in the indicating of gas engines. At this point the meeting was adjourned until the afternoon.

THIRD SESSION.

FOUNDRY SECTION.

It was found on the day preceding that there would be so much time consumed in the discussion of the papers scheduled for this meeting that it would be impossible to give them all the time they deserved, unless the papers on foundry practice were considered in a separate section. Accordingly in the morning (Thursday) there were two meetings in progress; the one reported above was held in the auditorium, with the president in the chair, and the section on foundry practice was held on the sixth floor, with Vice-President Edward N. Trump, Syracuse, N. Y., presiding. A report of this meeting follows:

Secretary Rice presented an abstract of the first paper,

"The Foundry Department and the Department of Engineering Design."

BY WILLIAM A. BOLE, PITTSBURGH, PA.

The paper emphasized, by the citation of numerous examples, the interdependence of the drafting room and the foundry and the necessity for close co-operation in order to secure the desired results in castings. It was shown how necessary it is for the designer to have a practical knowledge of what can be done in the foundry, particularly of the limitations of the processes of molding and casting. The point was brought out also that it is important that the foundryman be told of the uses to which his product will be put so that he may have recourse to special treatment in pouring and cooling. The writer cited failures due to designs which did not take into account foundry conditions, and other failures which resulted from the employment of unsuitable foundry processes. Methods of treatment for special cases were pointed out, special reference being made to the molding and casting of large cylinder heads for Corliss engines.

The discussion, which was participated in by H. M. Lane, J. E. Johnson, A. D. Williams, Jr., the chairman, and others, directed attention to several of the problems of the pattern shop and the foundry, particularly in the matter of filleting and of providing even sections so as to avoid the troubles coming from variations in the rate of cooling. It was pointed out that harm could be done by dispensing with fillets where needed; also in having fillets larger than needed. Attention was called to shrinkage troubles in metals having a flexible skin, and those in cast iron or steel where the skin is not flexible and the shrinkage is toward the skin.

The secretary also presented the next paper in abstract,

"Molding Sand."

BY A. E. OUTERBRIDGE, JR., PHILADELPHIA, PA.

The writer described the results obtained in the mechanical treatment of sand both in the increase of its toughness and porosity. Sand test bars were made both from treated and untreated sand, the treatment consisting in passing the sand through a centrifugal mixing machine. The mixing process more completely coated the silica crystals with the alumina bond, the sand being thus made very much stronger. The tests detailed by Mr. Outerbridge showed that sand passed once through the mixing machine had increased in toughness 75 per cent., and after the third treatment in the machine had increased 225 per cent. A single treatment in the machine is often sufficient and two treatments are all that are usually needed with any sand mixtures. The analyses of the three grades of sand used in the Sellers foundry were given as follows:

Strong Sand.

Strong Lumberton sand	(new)	= 14 parts.
Gravel	(new)	= 7 parts.
Floor sand	(old)	= 6 parts.
Coal dust		= 2 parts.

Special Strong Sand.

Strong Lumberton sand	(new)	= 9 parts.
Gravel	(new)	= 14 parts.
Coal dust	(new)	= 2 parts.

Fine Sand.

Weak Lumberton sand	(new)	= 14 parts.
Fine floor sand	(old)	= 4 parts.
Coal dust		= 2 parts.

Mr. Outerbridge referred as follows to the use of the centrifugal machine in the preparation of core sand:

"In mixing core sand containing flour, the effectiveness of the centrifugal method is still more strikingly evident owing to the almost total disappearance of the white flour due to its thorough commingling with the sand and black coal in one treatment. In recent years there has been a remarkable reduction effected in the cost, skill required and time consumed in making cores by the use of sharp sand and oil in place of the usual core sand mixed with flour or other binders. The oil sand cores require no ramming and are made by unskilled labor; cases almost without number might be cited where the actual cost of cores has been reduced by the oil sand method from 50 to 75 per cent. and over, and better results obtained in the foundry, with fewer wastes caused by the breaking down or 'blowing' of cores; no venting and but few core rods are needed. Thorough mixing of the linseed oil with the sharp sand is absolutely necessary, though rather difficult to obtain, and in accomplishing this the centrifugal machine is pre-eminent; in fact, it would be impossible without this machine to produce the remarkable results that are now daily recorded with oil sand cores in the foundry. The centrifugal machine is, of course, equally well adapted to the thorough mixing of core sand with the various core oils and core compounds that are sold for making cores. Experience has shown that in mixing sharp sand with oil for cores, the centrifugal machine should be run at a lower rate of speed than when mixing and at the same time tempering ordinary molding sand. Two treatments are sufficient to insure thorough mixing of sharp sand and oil for oil cores."

E. H. Mumford, in commenting on the paper, referred to two classes of treatment of molding sand, one consisting in putting the sand through a riddle or mixing it by shoveling or the use of a mill. The other treatment consists in rubbing the alumina or loamy portion of the sand into the silica. In the case of scraper conveyors, in which the sand is constantly pushed in one direction, the tendency is to cause the alumina to gather into balls while the silica crystals are wiped clean of alumina. The speaker described M. Ronceray's method of rubbing together loam and silica sand, the result being that each crystal of silica receives an alumina coating, the bond thus being much stronger than would be the case with ordinary methods of mixing. H. M. Lane cited the case of a foundryman who had saved $2000 a year by introducing a sand mixing mill for cores above 2 in. in diameter. The bond in the interior of the core was not burnt in casting, and by putting the sand of such cores through the mill the foundry got all the use of the unburnt bond. The mill, by distributing the bond evenly through the sand, permitted the use of a cheaper sand with less bond.

"Power Service in the Foundry."

BY A. D. WILLIAMS, JR., PITTSBURGH, PA.

The point was made that power would be used to a greater extent in foundry work but for the fact that few foundries are so designed that the means at hand can be used to the greatest advantage. A frequent drawback in foundry work is the time

spent in waiting for cranes. On the general subject of crane service these statements were made:

"The bridge traveling crane is a most useful machine, but it cannot be in two places at the same time, and as yet no successful method has been devised by which two of them can pass each other either on the same or on different levels; in fact, the use of bridge traveling cranes on two levels only adds to the expense and does not supply any advantages over those cases where all of the bridge cranes are on the same level. The jib crane is limited in usefulness, as it cannot serve floors outside of its radius, but a number of light column jib cranes, arranged so that they can be set up and transported from place to place as needed are very serviceable. This can be accomplished by placing permanent pintle bearings on a number of the columns and by designing the jib cranes so that they can be handled from point to point. The traveling wall crane affords the most satisfactory method of increasing the crane service without interfering with the bridge travelers above, and the column jib cranes below its level. The electric motor offers the most satisfactory method of operating hoisting machinery." In the latter part of the paper electricity, compressed air, steam and hydraulic power were discussed and their advantages and disadvantages in the operation of foundry equipment were noted.

"Because the largest part of foundry power requirements are intermittent, it is probable that electrical methods offer the most economical solution of the question, but against this the question of maintenance is often of more importance than the economy of operating expenses due to cheaper power. The class of labor employed in many foundry operations is not possessed of any amount of mechanical skill or electrical knowledge, and for this reason it is advisable that the motive power portion of the equipment be as nearly 'fool-proof' as possible and of the simplest possible construction. The use of electrical power necessitates the employment of one or more men to look after the motors, or else a considerable portion of the minor repairs must be made by outside help. Where the foundry is operated in conjunction with a machine shop the matter of maintenance becomes more simple."

In the discussion of this paper attention was called to the value of locomotive cranes and the possibility of bringing yard cranes into the foundry, an arrangement which, it was suggested, is an improvement on running the foundry traveling crane out over a portion of the yard by providing an opening in the end of the foundry. The locomotive crane, in addition to having a wide range of service in the yard, could be made very useful in shifting cars. A communication was read from Frank Richards taking exception to the statement in the paper that there is more trouble with leakage at joints in the case of compressed air than with steam or water, and particularly to the assertion that compressed air pipe lines are designed to remain tight only long enough to pass the acceptance test. The writer said that precisely the same fittings are used for air as for steam and water, and that it is easier to keep air joints tight than the joints of steam or water pipe. The Pennsylvania Company's extensive excavations in and about New York were cited. Practically no trouble had been found with leaking joints in the use of compressors in this work. In the various tunnels about Greater New York 80 air compressors had been installed, which have worked day and night at speeds never before recorded and under conditions more severe than have ever been counted on for pneumatic lines, and so far as leakage is concerned the results have been highly satisfactory. E. H. Mumford said that it was undoubtedly a fact that where leaks occurred in compressed air pipes they are subtle, and the power gets away through leaking valves without its loss being appreciated. If a dry air valve could be invented that would not leak a great increase would result in the efficiency of compressed air apparatus. S. D. Sleeth of the Westinghouse Air Brake Company spoke of the practice in this company's works. Water is used at high pressure, say 1300 lb. Its advantages are that very small cylinders can be used, and it is possible to see the leaks. With air larger cylinders are required. It is easier to keep an air line tight than a water line, there being no expansion and contraction in cold weather. Air is used advantageously in connection with molding machines on account of the cushioning effect. E. Ronceray referred to his practice in the operation of molding machines. The power is hydraulic, ½-in. pipes being used. He had used copper pipes, which are easy to bend, thus saving joints.

New Foundry of the Michigan Stove Company.

By W. J. Keep and Emmett Dwyer, Detroit, Mich.

This paper was presented by Mr. Dwyer, and described a foundry intended for bench work which eventually will have a mezzanine floor. The total hight is 30 ft. at the eaves and 50 ft. in the monitors. It is built principally of steel and glass, and the roof is of a novel construction.

"A Volumetric Study of Cast Iron."

By Henry M. Lane, Cleveland, Ohio.

Under the above title the author considered some of the phenomena connected with the heat treatment of cast iron. He said at the outset that in dealing with metals it is customary to regard the weight of the impurities present, but to pay little or no attention to the relative volumes of these impurities. For example, in the case of a No. 2 foundry iron, silicon is 2 per cent. by weight and 8 per cent. by volume, and the other elements, respectively, by weight and volume: Sulphur, 0.04 and 0.16 per cent.; phosphorus, 0.7 and 3.11 per cent.; manganese, 0.7 and 0.7 per cent.; carbon, 3.5 and 23.76 per cent. The total of impurities is thus 6.94 per cent. by weight and 35.73 per cent. by volume. Similarly, in a stove plate casting the total of the constituents named is 7.52 per cent. by weight and 41.22 per cent. by volume; in machinery iron, 5.9 and 34.01 per cent., and in a malleable casting, 4.09 and 24.19 per cent., respectively. As indicating the volume of impurities existing in cast iron, the case was cited of several small castings which had dropped by accident to the bottom of a pickling vat containing dilute hydrochloric acid. When they were removed several months later it was found that they were exceedingly light. While they looked like iron castings, they were brittle and difficult to handle without breaking. Analysis showed that by far the greater proportion of the iron had been removed by the pickle, while the remaining constituents formed a skeleton or sponge. Turning to the practical application of volumetric analyses of cast iron, the paper referred to the characteristics of malleable castings and stove plate as follows:

"It is known that when malleable castings are first poured the carbon is practically all in the combined state, and that the castings shrink about ¼ in. per foot from the pattern size. When the castings are annealed they expand about one-half of the amount which they originally shrunk, or ⅛ in. per foot. During this expansion the carbon is changed from the combined form to a very finely divided graphitic state, which is known as temper carbon. A long annealing in the presence of an oxidizing medium will remove practically all of this carbon from the castings, but results in a weakened casting. This volume study offers an explanation why this long annealing and removal of the carbon weakens the casting. In the first place, if the carbon could be taken from the malleable casting without any other change, we see that it would result in about 20 per cent. of the bulk of the casting being removed. In other words, the annealed malleable casting would contain 20 per cent. of voids. These open spaces would certainly not strengthen the casting, as it stands to reason that the carbon which formerly occupied them would support the iron about it to some extent. This carbon as it exists in the annealed casting is undoubtedly highly compressed, as is attested by the expansion of the iron due to the change in the carbon, and in this compressed state would assuredly form a support to the surrounding metal. But the carbon cannot be removed without involving other changes. If this carbon were to be removed by oxidation, it is certain that some of the iron would also be oxidized, and that the iron oxide thus formed would fill some if not all of the spaces left by the carbon. The iron would therefore be weakened not only by the removal of the carbon, but by the oxidation of a portion of the iron. This undoubtedly explains why a malleable casting which has been heated just above the recalescence point and held there merely long enough to convert all of the carbon from the combined to the temper form, without the removal of any of the carbon, is in its strongest condition. In the case of stove plate, where the nonferrous elements constitute over 40 per cent. of the volume of the metal, we can readily believe that the extreme fluidity of the iron is to a large extent due to the great percentage of impurities present. High phosphorus, which has always been found to produce fluidity, would be expected to exert a great influence, on account of the large volume which it occupies. The phosphorus is undoubtedly combined chemically with the iron, hence there is probably an error in considering it in its elementary or pure condition."

In the discussion J. E. Johnson took exception particularly to the portions of the paper dealing with the reasons for the carbon change in malleable castings and with the effect of the volume of phosphorus in the case of stove plate. He took issue with the statement as to the possibility of voids in a malleable casting, due to the removal of the carbon, as suggested by the author. There are no voids, in the speaker's opinion, either before or after annealing. He affirmed his disagreement with all that the paper contained bearing on the influence of the volume of the various nonferrous constituents of pig iron upon the character of the casting made from it, since, with the exception of graphitic carbon, these elements are chemically combined and under compression, and not in their natural state.

Adjournment was taken while this discussion was in progress and both sections were again united in the afternoon.

FOURTH SESSION.

The first paper considered was

"The Evolution of the Internal Combustion Engine."

By Sidney A. Reeve, Harvard University.

Emphasis is laid at the start upon the fact that the demand which guides this evolution is not one for further refinement of efficiency, but for greater mechanical reliability and adaptability. In these directions the steam engine sets a standard far ahead of the gas engine. With this in mind the author reviews, first, the possibilities for further development of the explosive type of engine. These possibilities comprise the design of a variable clearance Otto cycle machine, and also the development of a high pressure Lenoir cycle engine. Both of these are broad types, capable of many modifications and adaptations to different services. Secondly, the attention is turned to the field of continuous combustion under constant pressure, and the development of a Joule cycle machine which should follow closely steam engine lines of construction. The author closes with the belief that the gas engine of the future, although possibly performing its combustion explosively, is to be less like the gas engine of to-day than like the steam engine of to-day.

Reverting then to the discussion of the papers presented at the foundry section, Prof. Bradley Stoughton, Columbia University, presented a number of lantern slides showing some of the results of microscopic study of the carbon conditions in cast iron. These were prompted by the reference in Mr. Lane's paper to the lack of results from the application of the microscope to the problems of the iron foundry. The views shown were photo-micrographs of etched specimens of cast iron, containing various percentages of silicon, with corresponding changes in the proportions of combined and graphitic carbon. The differences in the crystalline arrangement and the increasing graphitic carbon areas accompanying increases in silicon up to 3 per cent. of the latter, were brought out. One of the slides gave the cooling curves for copper, white iron, gray hematite and Northampton pig, as shown in the paper by Prof. Thomas Turner, which appeared in *The Iron Age*, May 24, 1906. The expansions of the high phosphorus Northampton iron in cooling were conspicuous. The volume of the phosphorus, the speaker said, was not the cause of the expansions, but these resulted from the carbon assuming the graphitic form, the phosphorus at the same time making the iron pasty during solidification. The speaker also presented slides showing carbon existing at different stages in the cooling of steel, in the form of martensite and pearlite, and referred also to the other carbon forms, namely, austenite, troostite, osmondite and sorbite. Steel men long ago gave these substances consideration in connection with the changes occurring in the cooling of steel. Foundrymen similarly would learn much by the use of the microscope if they would cease to regard only the changes at solidification and would investigate those occurring at a critical point lower by several hundred degrees.

The next paper was

"Specifications for Iron and Fuel, and Method of Testing Foundry Output."

By R. Moldenke,

Secretary American Foundrymen's Association.

In it the characteristics introduced into iron and fuel by various amounts of accidental and intentional impurities were defined and the limiting values allowable in specifications described. Methods of testing were discussed, and the old and new types of specifications reviewed. The superior advantages of the new specifications and the new method of testing, as adopted by the American Society for Testing Materials, were shown. These new methods are now in general use.

This paper passed without discussion and the next was

"The Foundry Cupola and Iron Mixtures."

By W. J. Keep, Detroit, Mich.

This paper gave some foundry experiences and endeavored to aid the founder in the more economical operation of his plant. While the operation of a cupola will make or lose more money than any other part of a foundry equipment, yet this is due to the skill of the operator more than to any proportion of the cupola. Regarding iron mixtures, it seems difficult for the founder to understand the relation between chemical and physical composition and the effect of slow or rapid cooling. This paper treated of this and told how to calculate mixtures for various qualities of castings, also how to regulate the percentage of silicon by mechanical analysis.

Written discussion on this paper, submitted by George R. Brandon, Chicago, Ill., referred to linings. The writer favored blocks because they last longer than the same quality of square arched bricks and have fewer joints. He considered the defined bosh and enlarged melting zone as of doubtful benefit. Tuyeres may be located, so that any suitable quantity may be accumulated in the cupola before tapping. The lower the tuyeres the less the amount of fuel on the bed and the greater the economy. The fuel bed must be sufficient, however, to heat up the cupola whatever the hight of the tuyeres. With cupolas with 84-in. shell and larger, mechanical charging machines, he claimed, greatly reduced the labor of charging. A record showed that two men with such a machine can charge a cupola melting 18 to 20 tons per hour, which with hand charging would have required five to six men. He never knew of a ratio of iron to fuel in actual operation, as high as 18 to 1, which had been mentioned in the paper. Pigs and large scraps are generally considered to require more fuel than broken pigs and smaller scrap. From a record covering 11 months' operation in which over 13,000 tons were melted for car castings, the ratio of iron to fuel was 10.31 to 1. These were considered excellent results.

Prof. E. H. Foster described a cupola lining referred to in the London *Engineer*. The lining was hollow cast iron radial brick. It is claimed to effect increased capacity, saving in time for repairs, and use of ganister, and affords a perfectly smooth surface. After each run the surface could be swept clean, and there was no danger of the lining being broken by the charging process. Such a lining can be applied to almost any type of cupola. A number are in use in England, but the writer knew of none in this country. Another speaker advanced the opinion that in selecting scrap for iron castings to be machined, the scrap should show evidence of having been machined, so that it will be known to contain the required amount of silicon to make it easily machinable. Further, it is necessary to select according to the required thickness.

The next paper was

"Foundry Blower Practice."

By W. B. Snow, Boston, Mass.

It explained that in the fan type of blower the pressure depends upon the speed, the volume at constant speed varies with the outlet area, and the greatest power is required when the resistance is least, while in the rotary type or positive blower the pressure depends upon the resistance within limits, the volume is independent of the outlet area, and the power increases with the resistance. Local conditions largely determine relative superiority. In the best cupola practice the quantity of air supplied is considerably below that theoretically required. Tests show great and unnecessary variety in blast pressures. Pressure and melting rates should be as low, and cupola diameters as great as practical considerations will allow. Power expenditure is then the least.

A discussion submitted for H. de B. Parsons, New York, included curves and tables to calculate the horsepower of fans. This it was believed would be of value, inasmuch as the catalogues issued by blower manufacturers do not in general give this conveniently for the use of engineers. Dr. S. A. Moss questioned the absolute accuracy of the figures in the author's tables, i. e., he thought the figures were carried out to more places than warranted, and that they are only a close approximation at best. The final figures give a deceptive idea of the accuracy. He conceded the correctness of the author's formula for pressures up to 2 oz. per square inch. For greater pressures he declared a correction must be made to allow for the change of the density of the fluid during expansion.

A written discussion from J. R. Fortune and Harold S. Wells gave a record of cupola tests made by the engineering department of the Murphy Iron Works, Detroit, Mich. Needing increased cupola capacity without more or larger cupolas, experiments were made by substituting a positive pressure blower of greater capacity for a fan blower, and the melting rate was increased from 8½ to 9.45 tons per hour. The data gave the blower speed, blast pressure, &c. To get in the proper amount of air with a minimum blast pressure the tuyere openings were enlarged and the depth of the bed increased. By enlarging the tuyere openings and decreas-

ing the coke charges they increased the melting range to 11 tons per hour. Finally after experimentally arriving at the right amount of coke and pressure, they melted over 11 tons per hour. The fact that an excess of coke decreases the melting rate is explained in that the iron in the cupola is melted in a fixed zone. The first charge of iron above the bed being melted by burning the coke in the bed, as this iron is melted the charge of coke above it descends and restores to the bed the amount which has been burnt away. If there is too much coke in the charge the iron is held above the melting zone, and the excess coke must be burned away before it can be melted, and this of course decreases the economy and the melting speed. It is the writers' intention to investigate the gases in the cupola in the near future, analyzing them and comparing results obtained under varying conditions. Professor Williston wanted additional information on the curves given in the author's paper, which showed the changes in pressure, velocity, &c., with variations in discharge openings; also he wanted to know about the range of size of fans used, &c. T. L. Bailey, Wollaston, Mass., called attention to a large series of tests of low pressure boilers. The author then closed the discussion of his paper stating that Dr. Moss was right in that a large number of decimal places was not necessary in the figures given in the paper. The author stated that the results reported were not from any one series of tests, but a group of a large number of tests, and that the tables on volumetric basis are as used by the four large companies making blowers. He agreed that we do need more definite means of comparing ratings of blowers. The next paper

"Patterns for Repetition Work"

BY EDGAR H. BERRY, NEW YORK,

drew a distinction, based on output, between repetition and jobbing work. In the former, slightly cheaper production justifies considerable expenditure in designing and constructing. Pattern drawings, the author stated, are essential, and also cooperation between the drawing room and other departments. Drawings should show actual pattern dimensions, required accuracy, draft, parting and carding. Standard flask sizes are desirable. Limits were given for one-man molds. Plate patterns—ordinary, "reversible" or "split"—as preferred. Complicated partings compel "open" carding. Details discussed were: Hight and spacing of mold board cleats; unnecessary rounds and fillets; draft; dimensioning draft; runner sections; connection details; materials. Accuracy is unnecessary where finish is allowed, but is essential at other specified points. Economical construction methods were outlined, and working instructions quoted. Excessive pattern duplication should be avoided. Precautions on new work were suggested. Carding different patterns is altogether undesirable. Important construction details are accuracy of rounds and fillets, and fitting of flash pins to gauge.

Commenting on this paper, E. H. Mumford mentioned some difficult castings which the author undertook to make with molding machines and made successfully. He added some points from his own experience and referred to the French practice of casting duplicate parts with corners or edges touching. He also alluded to a fact not always realized, that it is not always machined patterns having a very smooth surface that are the best. A pattern should have no more smoothness than the casting to be made from it should have, and it will then be more accurate. H. M. Lane made a motion to refer to the Council the desirability of appointing a Committee on Standards for supplies, fittings and equipment in the foundry.

"Some Limitations of Molding Machines."

BY E. H. MUMFORD, PHILADELPHIA, PA.

In this paper a somewhat detailed discussion was given of the difficulties which molding machines must contend with. Briefly, limitations upon the machine are found in each of its operations and these were described in the paper. Many of the limitations known to the present American machines are eliminated in the new French machines described, which promise to carry the art of power machine molding further in this country than it has ever yet been carried, and it therefore seemed worth while to go somewhat fully into the characteristics of these machines.

The paper was discussed by E. H. Berry, who drew attention to points in the author's paper and his that agreed. E. Ronceray, by special invitation of the president, told something of the molding machine invented by him, and which was referred to in Mr. Mumford's paper. He also explained features of some new machines which were more recently invented. The author of the paper then closed the discussion, and the meeting adjourned until the following morning.

The usual reception to the president-elect and the retiring president was held Thursday evening and was very largely attended.

FIFTH SESSION.

The first paper Friday morning was

"The Specific Heat of Superheated Steam."

BY PROF. C. C. THOMAS, CORNELL UNIVERSITY.

In many respects this was the most important paper presented at this meeting. It covered three years' research work to determine the true law of the variation of the specific heat of superheated steam. For some years it has been believed that it is not constant, but there has been a division of opinion as to whether it varies with change of temperature, or of pressure, or of both. The author was led to take up an investigation into the subject because reliable values of the specific heat of superheated steam were not available. These values are important, because with them it is possible to figure the cost to produce superheated steam of given pressure and temperature at a given rate with a given efficiency of steam heating apparatus, and the amount of heat energy that may be counted upon as being available in a unit weight of superheated steam of given pressure and temperature. The results given in this paper show both true and mean specific heats of superheated steam, the mean being for temperature ranges starting at the saturation temperature. Description is given of the preliminary apparatus and experiments, the final apparatus and experiments and the methods by which the results were obtained and corroborated. In both cases electrically heated calorimeters were used and the method of making the calculations was explained. Numerous curves were given, plotted from the results, with corrections made in two ways for radiation losses to check one another. An exceedingly close agreement was obtained which confirms the accuracy of the method and the manner of conducting the experiments. The paper also compares the author's results with those obtained by various other investigators and shows the reason for formerly believing the specific heat of superheated steam very much higher than it is now proved to be. The form for recording the data from tests and making calculations in the final experiments, and a table of the recorded data were also given. The author's conclusions were that the specific heat of superheated steam varies with both pressure and temperature, increasing with an increase of the former and diminishing with an increase of the latter, and that the specific heat increases and decreases more rapidly when near the saturation point, with increase of pressure and temperature, respectively. These conclusions apply over the range investigated, which was for pressures from 7 to 500 lb. absolute and up to 270 degrees F. superheat for all pressures employed. The paper included a Mollier heat diagram which forms a graphical steam table, the superheated region of which has been calculated from the results of this work.

This paper was discussed by G. A. Moyer, who commented on the agreement of the results given by Thomas and as obtained by Knoblauch and Jakob for the mean specific heat. Above 250 degrees superheat the principal difference is observed. J. C. Parker of the Parker Boiler Company, Philadelphia, remarked that there is a considerable disagreement among engineers regarding this subject. He had found it practicable to design superheaters to transmit about 15,000 B.t.u. per square foot per hour, and hoped to have some definite data to present at the next annual meeting. A written discussion submitted by Prof. C. H. Peabody, Massachusetts Institute of Technology, expressed high appreciation of the importance of the experimental work presented by Thomas. He outlined what use he had already made of the author's results, which he was allowed to have in advance of the publication. This was in the preparation of a temperature entropy table to give the properties of steam, both saturated and superheated, at each degree Fahrenheit from 80 to 420 degrees, and at each 1-100 of a unit of entropy. The properties given in the table are the quality, the heat contents and the specific volume. The tables were made primarily for use at the Massachusetts Institute of Technology for teaching turbine design, and it is hoped will prove useful to others. The writer's communication was accompanied with two curves, one for the specific heat of superheated steam at 100 lb. and one for entropy due to superheating at 100 lb. absolute. These compared Knoblauch's and Thomas' results, and showed close agreement between them. The writer gave his reasons for thinking that Thomas' results are the more nearly correct ones. Secretary Calvin W. Rice suggested a committee to carry out research on this subject.

Messrs. Parker, Young and Moyer approved this suggestion and would like to see the work done for the good of experimenters and practical people who dislike to change their standards every year or so.

The next paper of the morning was

"Engine Design Adapted for the Use of Superheated Steam."

BY MAX E. R. TOLTZ, ST. PAUL, MINN.

The author gave as the advantages of superheated steam that it eliminates almost all cylinder condensation, and since its volume increases, the clearances in the cylinder are reduced. The degree of efficiency of the Carnot cycle in the engine is raised also. Highly superheated steam of 575 degrees to 625 degrees F. should be used, in the author's opinion. On account of the large wearing surface, which is difficult to lubricate, the Corliss valve can generally take steam having a temperature of only 475 degrees F. This is not high enough for good economy. Double seated poppet valves for small engines with slow piston speed and four seated poppet valves for large engines with high piston speed were mentioned as best for highly superheated steam, and piston valves were also recommended. The tandem type of engine was recommended on account of being able to use high piston sped, which reduces first cost.

H. H. Supplee gave an outline of ways in which a Belgian builder of engines had been successful. Another speaker thought the tables given in the paper were the most valuable on the subject. Harrington Emerson evpressed unwillingness to accept the figures as entirely reliable. Professor Lucke wanted to know about the poppet valve in the author's paper, with regard to its cost of maintenance, &c. J. C. Parker did not think that highly superheated steam is as suitable for large plants as for small engines, and believed that 500 degrees is the commercial limit. Another speaker supported the poppet valve as better than the Corliss valve gear, and mentioned the engines built by the Providence Engineering Works. A number of that firm's large engines using highly superheated steam are in satisfactory operation. Professor Lucke asked questions concerning the relation between superheat and flash points of the cylinder oil used. The author explained that he should have used the term evaporation point instead of flash point, and that it should be such that the oil will be carried along by the steam, leaving the cylinder walls dry. J. A. Seymour, Auburn, N. Y., agreed that 500 degrees was a good limit for the superheat allowable in a steam engine, inasmuch as an increase of economy beyond that point was not commercially worth while. L. R. Pomeroy cited his experience with pumping engines. After superheaters were installed the condensers were too small and the vacuum was not high enough. Only 24 in. was obtained, and about 18 degrees of superheat was found beyond the exhaust. Concerning the composition of cylinder oils, for use when the steam is superheated, E. M. Jennings stated that an oil should be used that will go off in smoke; that users should insist on purchasing filtered oil, and that the oil should have a flash point of between 350 and 400 degrees. Reverting to the valve question again, Mr. Seymour did not think that the poppet type is the only suitable one for superheat. The Interborough stations have engines of the same type with poppet valves and also Corliss valves, and the latter give the best economy because the fit is the tightest. The author concluded the discussion, and explained that the tables given were from actual tests. He also drew attention to the success on the Great Northern Railway of superheaters giving excellent performance sheets (not test sheets), and showed that 18 per cent. better economy is effected. He is confident that results will prove that less oil will be used with superheated steam than with saturated steam, and that the troubles from superheating will be overcome or will decrease in the future, when engines are designed regularly for high superheat. He also believed that the best plant in this country could be raised 8 to 10 per cent. in efficiency by judicious applications of superheated steam.

"Power Transmission by Friction Driving."

BY PROF. W. F. M. GOSS, UNIVERSITY OF ILLINOIS.

This, the next paper, described a friction drive, in which a fibrous or somewhat yielding driving wheel worked in rolling contact with a metallic driven wheel. The power which may be transmitted by such a drive is a function of the pressure of contact, which may be maintained between the wheels, and of the coefficient of friction, which is developed in consequence of this pressure. A method of experimentation designed to disclose numerical values for these factors was described. Facts concerning the pressure resisting and frictional qualities of fibrous wheels composed of such materials as straw fiber, leather, leather fiber and sulphite fiber, as determined by experiments, were set forth. Formulæ based upon these data, which may be employed for calculating the power that can be transmitted by such fibrous wheels when employed to drive wheels of iron, aluminum and type metal, were developed. Tables and diagrams based upon these formulæ constituted a summary of results in convenient form for use. A summary of observed data was given as an appendix.

In the absence of the author this paper was presented by L. R. Pomeroy and passed without discussion. The next paper,

"Cylinder Port Velocities,"

BY JACOB H. WALLACE, UNIVERSITY OF COLORADO,

explained that the velocity of flow through the port of a steam engine depends upon the port opening and the piston velocity. For a constant velocity of flow during a stroke the port opening must be proportional to the piston velocity. If the piston velocity be applied graphically to represent port opening, as in a Bilgram valve diagram, a steam lap curve for a constant velocity of flow will be established. A valve gear to afford that velocity of flow must provide the same port opening for the same crank position. A set of curves may be obtained by establishing other constant velocity curves by means of which the velocity of any crank position may be determined.

This paper also passed without discussion.

FINALE.

The president put to vote the offering of the usual thanks for courtesies extended during the convention of the society by Charles M. Jacobs, engineer of the Hudson Companies, and those who had thrown their plants open for inspection. He also called attention to the growing practice of having accredited representatives of other societies attend the various conventions of different societies, and mentioned that there were present in this instance M. Delaford from the Societé des Ingenieurs, Paris, France, and Henry Fiske, managing superintendent of the specification department of the National Fire Protection Association.

The secretary displayed a present to the society in the form of an old gear cutter, which was received from A. D. Finley, an associate member of the society, and now connected with the E. J. Manville Machine Company, Waterbury, Conn. The following was the communication received with it:

This gear cutter was made and used in the works of Russel, Burdsall & Ward, Port Chester, N. Y., in 1848, so I have been informed by one of our old employees, who used to run the miller that this was used on. I am told that this cutter was formed on a lathe with the old style hand tool, and the teeth cut with a file. The milling machine that this was used on was also made by the firm, under W. E. Ward's supervision, and was also invented by him. Most of the work on the machine was chipped with a chisel and finished with a file, as they did not have any planers or shapers to do this class of work. This machine was so arranged that bevel and miter gears were cut on it, giving fairly good results. The worm wheel on the work spindle was cut by revolving a tap in a lathe and holding the disk against it. This wheel contains 720 teeth and was made in sections of brass. The machine is in good repair and was used up to 1899, for milling nicking saws, giving excellent results.

A vote of thanks to Mr. Finley for this contribution was carried.

The attendance of members registered was 727, and guests 605, or all told, 1332 at the close of the registration on the last day. This is far in excess of any net registration of members of this society, or any national body of similar character. It was the opinion that the double session experiment was a success and probably this precedent will be followed in the future as it offers the advantage that those in attendance may give their time most profitably to the consideration of such papers as they are most interested in.

The Proceedings of the tenth annual meeting of the American Society for Testing Materials just issued make a volume of 759 pages. Among its important features are the discussion on steel rails at the meeting of 1907, the paper of Allerton S. Cushman on the "Electrolytic Theory of the Corrosion of Iron," and the papers and discussion on the purchase of coal under specifications. It is stated that the discussion on steel rails will be continued at the meeting of 1908, and the members are invited to contribute to it.

A French View of Our Crisis.

The American bankers and theoretical economists who are inclined rather acrimoniously to saddle the blame of the present financial crisis on imprudent business expansion should read and digest the remarks of M. Dupont of the banking firm of Dupont & Farland, Paris, made at a recent banquet in that city. He is reported in part as follows:

The Abuse of Credit.

"To my mind there is only one fundamental cause of the present crisis in the United States, and that is the abuse of credit, the disproportion which exists between the country's development and its financial resources. All active countries are subject to crises. The more a country develops the more subject it is to regular economic disturbances. America and Germany are striking examples of this. In order that a country be free from such disturbances its development would have to be normal—that is to say, its business enterprises would have to be in exact proportion to its monetary wealth. You cannot expect from an entire population the unity of knowledge possessed by a single experienced business man.

"Then here again enters the question of racial temperament. It would seem that there is an inevitable relation between the temperament of a race and the needs of the country it inhabits. Americans comprise the most active, I may say the boldest, elements of old Europe. This explains at once America's marvelous economic energy, and also the violent convulsions that mark its commercial history. America, after each crisis, makes a tremendous step forward. No period of hard times or retrenchment has ever carried her back to where she was at the last preceding crisis. The very enterprises, too vast and undertaken with too great a speed, which cause the crisis, indicate a strength which will assure an even greater prosperity after a period of rest.

The American Business Man's Character.

"The character of the American business man is not sufficiently well known in France. The opinion is widespread that he is dishonest; that his sole ambition is to launch a new company and sell its watered stock to the public. Such things do happen in America, but they are not common. The American doesn't want money for money's sake. He wants it because it represents success, and success is what he is after. The American works for success, and when he undertakes any business it is to be the most successful of its kind. So convinced is he of this that he not only puts all his own money into the stock that he has just created, but all the money that he can borrow. He perpetually commits the same mistake—takes upon his shoulders too great a burden and falls before he reaches his goal.

"In view of this American spirit of daring, it is not surprising that much of the business of the country—and of the very best—rests to a great extent on credit. They forget too easily in America the relation which should exist between the working capital of a concern and the amount of business it tries to do. The American never anticipates hard times. For him American prosperity must go on without a halt. That is how it happens now and again that a company, at the hight of its prosperity, must go into the hands of a receiver. Banks cannot go on renewing paper forever, be the paper of the best. I think that it can be said, therefore, without contradiction that the primary cause of the present crisis is the abuse of credit.

Overcapitalization Supplies Its Own Remedy.

"Newspapers have also had much to say about speculation and overcapitalization. Overcapitalization exists in America, I admit, just as it does in every other country of the world. But this view always supplies its own remedy. The company's earning power either makes good this excess of capitalization or the price of the stock shrinks until its real value is reached.

"In America, as more or less everywhere else, those who risk their money in founding a company are rewarded with shares of common stock—a tangible form of the company's hopes. This stock very often later on goes far above par. Is its real value decreased by the fact that the stock cost nothing in the first place? The stock exchanges of the world answer the question.

"Americans, temperamentally, are more inclined to speculate perhaps than some of their neighbors, but I do not think that speculation, any more than overcapitalization, can be considered as a real factor in the crisis. Both are contributory causes in a way, for they increase the need of ready money, but they are not the real causes, despite sensational charges to the contrary.

Some Indispensable Reforms.

"To restore confidence and prosperity to the country, certain reforms are now indispensable. First of all, the reform most necessary is an improvement in the country's currency system, in the methods of emission, perhaps in the national bank law. Next comes the reform of the trust companies. They should return to the old régime—submit themselves to the clearing house rules, and again maintain a minimum reserve of 25 per cent.

"As for the trusts, despite the régime of absolute liberty of action, which is the favorite régime in the United States, it will be necessary to prevent them from forming monopolies. One of the most efficient means of doing this will be, perhaps, to modify the tariff. As for the railroads, it is certainly preferable that they be regulated by Federal rather than by diverse State legislation.

"The next few months will see this work of regeneration in full progress. Once more we shall see American energy overcoming every obstacle. When a country's soil and subsoil are as rich as America's, when its inhabitants are so prodigiously active, its development will be all the faster for a momentary breathing spell. To conclude, America is still what a German writer recently called it: 'The land of unlimited possibilities.'"

Customs Decisions.

A Question of Procedure by the General Appraisers.

The United States Circuit Court of Appeals, after two years of litigation, has handed down a decision favorable to the contentions of Thomas Prosser & Son, New York, agents for the Krupp Steel Company, Germany. The court holds that the full membership of the Board of United States General Appraisers is not entitled to the right of transferring an importer's protest from one subboard to another after the tribunal first hearing the issue has formulated a decision.

In the case in question, Prosser & Son were dissatisfied with the classification returned by the Collector of Customs on certain merchandise, and filed an appeal in the usual manner. Hearings were held by one of the subboards, of which there are three connected with the General Board, and later a decision was arrived at upholding the claim of the importers for a lower rate of duty. Before the decision was promulgated, however, five of the nine General Appraisers, by formal vote, took the determination of the issue from the subboard having the case under consideration and assigned it to another subboard. The second subboard made a decision against the classification contended for by the importers, whereupon the latter asked the Circuit Court to review the legality of the board's action. The Circuit Court decided that the board had the right to transfer the issue from one subboard to another, but the higher court takes the contrary view. The Government, it is understood, will ask the Supreme Court to review the Appellate Court's decision.

Wood Patterns for Machinery.

The Board of United States General Appraisers has sustained a claim filed by Knauth, Nachod & Kuhne, New York, for the free entry of wood patterns for machinery not fitted for use otherwise. The action of the collector in classifying the articles as manufactures of metal, with duty at the rate of 45 per cent., is reversed.

Retort Carbon.

The board has also sustained the claim of Thomas Meadows & Co., New York, for a lower duty on ground carbon, known in the trade as retort carbon, and used in the manufacture of electric batteries. The decision reduces the duty from 35 per cent. as "carbon not specially prepared," to 20 per cent., as "nonenumerated manufactured articles."

THE IRON AGE

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Pig Iron Curtailment in 1903 and 1907.

The sharp restriction of pig iron production which has been the conspicuous feature of the iron trade in the past six weeks recalls the similar movement in the recession of 1903. In both instances the steel companies set the example in heroic handling of the situation, the Steel Corporation naturally taking the initiative; but in 1903 the merchant furnaces of the Central West, especially those of the Mahoning and Shenango Valleys, more quickly felt and more promptly responded to the slump than has been the case in the present crisis. The blowing out of a furnace, where relining is not urgently needed, is ordinarily a matter for deliberation. It means much more than the stopping of a mill, and when it is resorted to to prevent the accumulation of iron which the market will not take represents the judgment of the operating company that the reversal of the untoward conditions is not a question of days or of weeks. The alternate startings and stoppings of mills in recent weeks have no such significance as has been attached to them in the newspaper dispatches, representing only fluctuations in the incoming of specifications. On the other hand, the putting out of a furnace after due preparation in the working up of raw materials and the accumulation of some stock against scheduled shipments, means that for 60 days or for several months, idleness is counted more profitable than to keep running.

Just now the chance to make repairs and to reline after a hard campaign helps to the decision to blow out. Many months of profitable business since the last stop are also a large factor. Not only is iron not being crowded upon a market that has come to a standstill, but no more high priced materials and labor than must be will be put into iron to pile on yards. Ores of 1908 are little more than four months off; the coke basis for next year is in many cases undetermined, and labor adjustments at the turn of the year are practically a certainty. Even with the cutting off of production to the extent already enforced, stocks of iron have increased, though not at the rate of the late months of 1903 and the early months of 1904.

A chief contrast between the blast furnace situation in 1903 and that of 1907 is due to the expansion in production that for nearly all of this year has kept the weekly average of active capacity in coke and anthracite iron above the 500,000-ton mark. On September, 1903, the active weekly capacity was 360,197 tons. The changes from September 1 to December 1 in the two years were as follows:

Active Blast Furnace Capacity, September 1 to December 1.

	1907.		1903.	
	Number furnaces.	Weekly capacity. Gross tons.	Number furnaces.	Weekly capacity. Gross tons.
September 1	331	507,768	269	360,197
October 1	333	511,397	254	353,142
November 1	304	491,436	210	273,715
December 1	226	347,372	186	244,156
			1904.	
January 1			155	185,636
February 1			188	273,692
March 1			203	308,751
April 1			220	337,257
May 1			230	368,244

We have carried the statistics for the 1903-1904 movement into the early months of 1904 to show the rebound from the low point reached on January 1, 1904. It is certain that on the coming January 1 fewer furnaces will be in blast than at the beginning of the present month. It will be interesting to note whether the parallel goes farther, with an advance on February 1 beyond the figure for December 1. It is to be noticed that in 1903 the most abrupt change was between October 1 and November 1—a falling off of 80,000 tons, or 23 per cent., while for this year, if the figures were plotted the steep curve would be between November 1 and December 1, the actual decrease in active capacity being 144,000 tons, or over 29 per cent. The number of furnaces blown out in October, the critical month in 1903, was 44, against 78 in November, the critical month of 1907. Thus, both in number of furnaces and in weekly capacity cut off, the movement of last month was about 180 per cent. of that in October, 1903. The present curtailment is more drastic than that of 1903, since the rate of pig iron production before it began was about 140 per cent. of the rate of 19,000,000 tons a year, at which iron was being made previous to the October slump four years ago.

Shirking to Prolong Employment.

When business becomes less active, a certain class of labor, which includes a considerable percentage of skilled workmen, displays an inclination to prolong every task, on the theory that the day of possible laying off may thus be postponed or avoided altogether. With some men the reduction of producing capacity is excusable, being due to a reaction following a long period of continuous, high tension labor, during which those in authority had strained every effort to get out work at the earliest possible moment, making every hour of working time of man and machine count to the utmost. But many times the reason for decreased production on the part of a workman is the desire to make a job run on as long as possible, in the fear that it may be the last before a period of idleness. Superintendents and foremen and keepers of cost systems have had to be watchful against this tendency, which, of course, is easy of detection if the cost system employed is developed sufficiently to afford comparisons with similar work previously performed. It does not matter whether the workman is on piece work or hourly wages; if he falls behind previous records the system shows up the deficiency. But, as already suggested, the fault is not always with the workman. The extreme effort to produce rapidly that has prevailed for the last two years is not a normal condition in an industrial plant, and its records of production cannot always be accepted as standard. Improved quality may more than compensate for a smaller quantity, and, it may be added, a change in this respect may prove most beneficial in some establishments which have been inclined to sacrifice much in the endeavor to keep up under the stress of overabundant orders.

In *The Iron Age* of October 3 the grave question of

the efficiency of modern labor was discussed. In this connection, in seeking for economical high-class production, the weeding out process of discharging incompetent or otherwise undesirable workmen has proceeded steadily, constituting for employers one of the compensating features of the business depression. This has been no very difficult task in most works, for the incompetent and slothful, and those so hedged about with the restrictions of the labor unions that they will not do their best work, are well known to the men under whom they are employed. But the trouble remains, to a somewhat serious extent, to judge from the complaints of some manufacturers, that men who have been retained have exhibited a tendency to curb their productive powers, because the imperative need of persistent, rapid work has ceased to exist for the time being. Superintendents and foremen have the power to quickly institute reforms in this respect, if they realize the condition and attack it vigorously.

There are many manufacturing plants where cost systems have not been refined to the point of ascertaining exact labor costs for individual operations. There is no record of the cost of an operation on a piece manufactured six months or a year ago, upon which to base a comparison with the cost of the same work to-day, and consequently the efficiency of a workman must then be based upon the judgment of the man in charge of the work. A certain amount of shirking or unintentional lapse into lower production is not easily detected in such a case. But with a good cost system, which tabulates the exact labor cost of each piece or operation on each piece, a decrease of production, and consequent increase in relative cost, may be quickly noted if the effort is made to ascertain the facts. It is safe to assert that in works where the cost system is complete there is more consistent effort on the part of workmen than where it is known that no such means of detection exist. When the volume of production decreases the overhead cost increases; and there is, of course, no time when economies should be practiced consistently as during a lull in business.

The Suggested National Incorporation Law.

President Roosevelt, in that part of his message to Congress recommending a Federal incorporation law for companies doing an interstate or foreign business, appears to refer especially to the need of such a provision for its effects upon great combinations of capital. Apart from the application of Federal supervision to the so-called trusts, there has been for a long time a strong feeling that means should be taken to institute a sounder incorporation system in the United States to replace the loose and inadequate laws of most of the States. A Federal law has been regarded by many as the best solution of the problem. It would further relieve manufacturing companies doing an interstate business from many vexatious regulations now imposed on them by different States. The President's suggestion that corporations be controlled under a system of supervision similar to that of the national banks could be amplified to include a rigorous insistence that capital stock should stand for actual assets, and that annual statements of financial condition should be furnished in detail, to give a comprehensive public knowledge of the corporation's business standing, under severe penalty for omission or for misleading or erroneous figures. Under such conditions a given amount of capital stock would represent that amount of property, in cash or its equivalent. Coupled with the annual statement, it would furnish a basis of credit. The President's suggestions appear to have been embodied in the bill just introduced in the United States Senate by Senator Platt of New York, as referred to elsewhere.

The task the Government would undertake under such a law would be a great one. The number of going corporations which would come under a general act is enormous, while the applications for new charters would appear in a steady stream of considerable volume. But with the machinery once established and running smoothly, it is believed that the results would be highly beneficial, considering the question from its effect upon corporations in general. The prime question, of course, is that of the great industrial organizations for which the law would chiefly be established. It may be decided upon as the remedy for such abuses as may exist in combinations of capital on a large scale. If, however, it is to be adopted at all, decided benefits would result from the inclusion of smaller corporations down to those capitalized at $100,000. Corporations that base their capital stock upon actual assets would probably have no objection to being compelled to hold a Federal charter, while many of them would welcome the prestige that would come from official statements of their financial standing.

Readable Signatures to Business Letters.

A correspondent has forwarded to this office a signature cut from a letter recently received by him. This signature is fearfully and wonderfully constructed. At first glance it looks as if it was either a tracing for embroidery or an imitation of a spider web. Very careful scrutiny is required to detect the semblance of letters of the alphabet. It is an exhibition of decided ingenuity on the part of the wearer of the name to baffle the efforts of all save experts in handwriting to decipher it. Commenting upon it, our correspondent says:

"These are days when everything is being specialized, and in answering correspondence it is necessary to head your reply, 'Attention of Mr. So and So,' whose signature follows that of his firm. The signature forwarded herewith was taken at random and is only one of many that has to be deciphered in every mail. Why is every one 'ape-ing' some untranslatable way of writing his name? In answering a letter thus signed, the attention of the individual cannot perhaps be secured, because his name could not be read so as to be referred to in the correspondence. Failure to use the name then frequently causes serious delays or oversights, especially with large concerns having many departments."

This complaint is justified as to business correspondence. Possibly a bank president or cashier may be justified in cultivating a signature so disguised as to make it difficult to imitate. An artist or a school boy may be too severely criticised for writing his name in such a way as to attract attention. Manufacturers and merchants, however, are continually conducting correspondence with plain business men who do not use frills themselves and who are annoyed when they are unable to read the names of those who write letters to them. The untranslatable names are written by two classes of people —those who are naturally poor writers and those who purposely make their signatures unintelligible. If they cannot be induced to attempt to write their names plainly, their correspondents should insist that the names be typewritten the same as the body of the letter, with the formal written signature over or under it. By all means let us have readable signatures to business letters.

OBITUARY.

CHARLES DOUGLASS, New York City, died December 4, aged 78 years. He was born in Manchester, Vt., and, coming to New York at an early age, entered the hardware business, in which he was active for almost 50 years. He was one of the pioneers in the manufacture of barb wire, having long been president of the Iowa Barb Wire Company, which was ultimately absorbed by the American Steel & Wire Company, of which he became a director. His health failing, he retired from business eight years ago. He leaves a widow and one son.

FRANK LEE ZIMMERMAN, Portland, Ore., died November 24, aged 39 years. He was a native of Maryland, but had been a resident of Portland for 20 years. He was connected for a long time with the Wolff & Zwicker Iron Works and for the past seven years was president of the Zimmerman-Wells-Brown Company, one of the leading machinery houses of the Northwest. He took an active interest in the welfare of the city and State. He leaves a widow and two daughters.

LEANDER RANEY, who had long been prominent in the manufacture of iron at New Castle, Pa., died November 30, at Cleveland, Ohio, where he had been visiting his son. He was 70 years of age and had retired from business some years ago. He leaves a widow, one son and one daughter.

CHARLES A. MCNAIR, St. Louis, died November 28, aged 76 years. He removed to Missouri from Pennsylvania at an early age and settled in St. Louis in 1865. He was president of the St. Louis Blast Furnace Company, originally known as the Pioneer Furnace Company, and later as the Missouri Furnace Company.

LESTER L. ENSWORTH, head of the firm of L. L. Ensworth & Son, Hartford, Conn., dealers in iron and steel, died December 1, aged 66 years. He was born in Hartford, the son of Horace Ensworth, and when a young man entered the employ of Clark & Co., iron and steel merchants, and in 1868 was admitted to partnership in the business. At the death of George H. Clark, in 1881, Mr. Ensworth succeeded to the business, which under his management has become one of the most important of its line in New England. He was a member of the Hartford Club, a director of the First National Bank and of the Mechanics' Savings Bank, and had served several terms in the Hartford city government. He leaves a widow, a daughter and two sons, one of whom, Horace H. Ensworth, is a member of the firm.

An Electrically Driven Sheet Copper Mill.—The new plant of the Buffalo Copper & Brass Rolling Mills, at Black Rock Station, near Buffalo, N. Y., will be driven by means of induction motors, supplied with power transmitted from Niagara. For driving the rolls three Allis-Chalmers motors will be used, one of 500 hp. for the main rolls and two of 250 hp. for the finishing rolls. All three motors are of the wound rotor type designed to operate at 25 cycles, 2300 volts; the 500-hp. motor runs at 375 rev. per min. synchronous speed and the 230-hp. at 500 rev. per min. The motors are connected to the rolls by means of flexible couplings. The construction throughout is very substantial and suited to the exacting requirements of rolling mill work. Each motor is provided with a cast grid secondary starting resistance, with an oil immersed controlling switch for cutting the resistance out of circuit and gradually bringing the motor up to speed. A small part of this resistance is designed for continuous service and can be left in circuit. B. J. Dashiells is consulting engineer in charge of the new construction and equipment, which will be used chiefly in the manufacture of copper sheets.

The Great Northern Railway Company has placed orders with the General Electric Company, Schenectady, N. Y., for four 100-ton electric locomotives to be used in handling trains through the Cascade tunnel, near Seattle, which is three miles in length. Each locomotive will be equipped with four 3-phase motors each rated at 325 hp., or a total of 1300 hp.

PERSONAL

W. H. S. Bateman, who is well known in the East and South among the users of iron and steel products, having been connected with the Lukens Iron & Steel Company, Coatesville, Pa., for a number of years, and recently Southern sales agent of the Chicago Pneumatic Tool Company, has been appointed as general and Southern sales agent of the Champion Rivet Company, Cleveland, Ohio, with headquarters at Philadelphia, Pa. He will look after the interests of the Champion Victor rivets in eastern Pennsylvania, western New York and the Southern States.

M. C. Keating, formerly with the Nolan Stave & Lumber Company, Memphis, Tenn., has been appointed Southern sales manager for the Russell Wheel & Foundry Company, Detroit, Mich.

William T. Goodwin, night puddle boss of the Brown-Bonnell plant of the Republic Iron & Steel Company, Youngstown, Ohio, has resigned. He had been connected with this plant for 31 years.

C. W. Dyott has resigned his position with the Westinghouse Electric & Mfg. Company, and has opened an office in the Westinghouse Building, Pittsburgh, as engineer, making a specialty of electric motors and electrical operating mining machinery.

Elbert H. Gary, chairman of the United States Steel Corporation, has been elected president of the Railroad Club of New York, which will occupy the twenty-first and twenty-second floors of the new Cortlandt Building of the Hudson Terminal companies as a luncheon club only.

R. H. Sweetser, superintendent of blast furnaces of the Algoma Steel Company, Sault Ste. Marie, Ontario, since the furnaces were first started in the fall of 1904, has resigned to become superintendent of the Columbus Iron & Steel Company, Columbus, Ohio.

Carnegie Rail Specifications.

The Carnegie Steel Company, Pittsburgh, Pa., put in effect November 1 new specifications for standard Bessemer steel rails, to govern contracts made with its customers. The specifications cover all the usual points. The most important are the following:

1. Chemical Composition:

	50 lb. up to 60 lb.	61 lb. up to 70 lb.	71 lb. up to 80 lb.	81 lb. up to 90 lb.	91 lb. up to 100 lb.
Carbon:	0.35 to 0.45	0.35 to 0.45	0.40 to 0.50	0.43 to 0.53	0.45 to 0.55
Manganese:	0.70 to 1.00	0.70 to 1.00	0.75 to 1.05	0.80 to 1.10	0.84 to 1.14
	Not over				
Phosphorus:	0.10	0.10	0.10	0.10	0.10
Silicon:	0.20	0.20	0.20	0.20	0.20

2. Shrinkage:

The number of passes and speed of train shall be so regulated that, on leaving the rolls at the final pass, the temperature of rails of sections 75 lb. per yard and heavier will not exceed that which requires a shrinkage allowance at the hot saws of 6 7-16 in. for a 33-ft. 75-lb. rail, with an increase of 1-16 in. for each increase of 5 lb. in the weight of the section.

No artificial means of cooling the steel shall be used after the rails leave the rolls, nor shall they be held before sawing for the purpose of reducing their temperature.

A protest has come from union patternmakers and iron molders in New York City against the proposed rule of the Building Department that no cast iron columns can be used in any steel skeleton building of more than six stories.

Halsey N. Barrett and Henry W. Nuckless have been appointed receivers for the Electric Vehicle Company, a New Jersey corporation, with a capital stock of $20,000,000 and a plant at Hartford, Conn. The assets are placed at over $14,000,000.

Congressional Projects for Tariff Revision.

WASHINGTON, D. C., December 10, 1907.—Plans now being laid by a variety of interests point to the revision of the Dingley Tariff act at a special session to be called immediately after the inauguration of the next President in March, 1909. This project will be opposed by the high protection element in Congress, but there has recently been an important defection among the stand-patters, and the revision sentiment has assumed such proportions that it cannot safely be ignored by the business community.

The President's Revision Policy.

Those who favor the comprehensive overhauling of the Dingley act are greatly pleased with the utterances of President Roosevelt in his annual message, which they regard as the keynote of the coming campaign. The President, while declaring that the country is definitely committed to the protective system, expressed the opinion that the tariff law should be carefully revised in the near future, and that although the subject could not "with wisdom be dealt with in the year preceding a Presidential election because, as a matter of fact, experience has conclusively shown that at such a time it is impossible to get men to treat it from the standpoint of the public good," the wise time to deal with the matter was "immediately after such election." These utterances are accepted as indicating that the President in his message to the next session of Congress, which will meet a year hence, will devote the document largely to pointing out the necessity for revision and the general lines that should be followed in readjusting rates and classifications.

Very serious consideration of the prospective revision is being made by prominent members of the majority in both houses. Senator Beveridge of Indiana, who has always been classed with the stand-pat contingent of the Senate, has drafted a bill providing for the appointment of a commission to frame a new tariff law, his object being to take the question as far as possible out of the domain of politics. He has submitted his bill to his colleagues among the majority leaders, and declares that he will make every possible effort to secure its passage in the present Congress. He does not, however, claim that his bill will have the support of the high protectionists, and it now seems probable that the contest over the measure will be a notable feature of the Congress.

Northwestern Republicans Favor a Commission.

The first move in the same direction in the House has been made by Representative Steenerson of Minnesota, who stands for the more radical Republican element of the Northwest, which for several years has sought to secure the comprehensive revision of the Dingley act. Mr. Steenerson has introduced a measure authorizing the appointment by the President of five commissioners from civil life, not more than three of whom shall belong to the same political party. It is to be the duty of the commission to make a careful investigation and to prepare a report to be submitted to Congress not later than the first Monday in December, 1908, upon the following specific questions:

1. What, if any, article of domestic manufacture or production under existing law bears a lower duty than the difference between the average cost of production during the last five years here and abroad?
2. What, if any, article of domestic manufacture or production under existing law bears a higher customs duty than the difference in the average cost of production during the last five years here and abroad?
3. What, if any, article of domestic manufacture or production under existing law bears a higher customs duty than the ordinary domestic selling price of such article?
4. To what extent the practice of charging a higher price in the domestic market than for export prevails in the United States, and what relation, if any, tariff duties bear to such practice?
5. To what extent, if any, monopolistic combinations control the sale and distribution and selling price of articles of domestic manufacture or production upon which duties are now imposed, and what, if any, changes of law would tend to restore domestic competition and the destruction of such control?
6. Whether a system of maximum and minimum duties might be prescribed upon any article with advantage to our foreign commerce, and, if so, upon what articles such duties should be imposed?

It will be noted that Mr. Steenerson's plan does not provide for the actual drafting of a new tariff bill by the commission, his idea being that this work must devolve upon the appropriate committees of the two houses, but he believes that much time can be saved and an impartial investigation secured by intrusting the preliminary work to a body of civilian experts.

Attitude of the Minority.

The attitude of the Democratic minority on the subject of the tariff is reflected in a series of bills already introduced by Representative Williams of Mississippi, the minority leader. The first of these measures proposes a horizontal reduction of 20 per cent. from the Dingley rates upon the products of all countries which accord to the products of the United States the minimum rates of their respective tariffs. This measure establishes in effect a maximum and minimum tariff without further legislation by Congress, the maximum rates being the duties now levied by the Dingley act. The second measure submitted by him proposes to put immediately into effect the provisions of the French reciprocity treaty negotiated nearly ten years ago but never ratified by the Senate nor approved by Congress. A proviso to this bill stipulates that the reduced rates shall not go into effect until France has granted the minimum rates of her existing tariff to all American products with the exception of about a score of relatively unimportant items. Mr. Williams expresses the belief that the present is an exceedingly appropriate time for Congress to give its approval to this measure, in view of the fact that France now has in contemplation the adoption of a new tariff which will materially increase the duties on American products entering French ports, and therefore will jeopardize a large trade. He has also devoted considerable time to a study of the metal schedule, and has presented two measures bearing thereon. One of these bills provides that:

> All steel beams, plates, angle irons, rivets, shaftings, propellers, castings and all other materials, either raw or manufactured, shall hereafter, upon importation into the United States, be free of duty wherever it is shown to the satisfaction of the Secretary of the Treasury that they are imported for the purpose of being used and are actually thereafter used in the construction of sailing or steam ships at American ship and navy yards.

Mr. Williams has also introduced a resolution directing the Secretary of the Treasury "to send to the House of Representatives all the lettters, documents, records and other information in his possession, or in the possession of the Treasury Department, on the subject of additional duties of 1 cent per pound on cold rolled steel or cold rolled strip steel under the provisions of paragraph 141 of the tariff act of July 24, 1897, since January 9, 1902." This resolution is intended to develop the facts upon which the Treasury Department has continued to levy the additional duty on cold rolled strip steel, and the influences that have prevented the department from accepting the decisions of the courts adverse to the Government.

A comprehensive measure providing for the importation in bond of iron and steel and other materials for the construction, repair and equipment of vessels has been introduced by Representative Rainey of Massachusetts. Vessels receiving the benefits of this act are to be allowed at all times to engage in the coastwise trade of the United States except vessels built for foreign account and ownership.

Several bills have been introduced providing for the free admission of coal of all kinds, and an effort is being made to induce the House leaders to pass one of these bills as an independent proposition. It is obvious, however, that such a measure would be subject to amendment by the addition of other commodities, and it is the best opinion here that no changes in existing tariff rates will be authorized by Congress until the Dingley act is taken up for comprehensive revision.

Great interest attaches to the personnel of the Committee on Ways and Means, which will probably be announced by the Speaker about the 16th inst. There are several vacancies on the committee. W. L. C.

Wood Distillation.*

The By-Products of Charcoal Manufacture.

BY W. C. GEER.

There are two distinct processes for obtaining valuable products from wood by distillation—destructive distillation and steam distillation. In the destructive process the wood fiber is broken down and new compounds are formed, but in the steam process this is not properly the case. In both processes the volatile compounds of the wood are vaporized. In destructive distillation heat is applied below the wood containing vessel, which has a comparatively small pipe as its only outlet. The heat vaporizes the volatile compounds, such as water and turpentine, and breaks down the nonvolatile compounds, such as cellulose and the wood gums; it forms a number of new compounds, usually of a simpler chemical nature, and these in turn are vaporized with the water and turpentine, leaving a residue of charcoal. The decomposition of the wood in this process is exceedingly complicated and is not yet fully understood.

In steam distillation, which is much simpler, the wood is chipped and placed in a closed receptacle into which steam is blown from a boiler, and the volatile compounds which are not chemically united with the rest are vaporized and carried out of retort with the steam. Though in practice the wood is often so much overheated that the wood fiber is slightly decomposed, and though it is quite possible to carry the overheating so far that the process becomes one of destructive distillation, it is nevertheless true that "steam distillation," as the term is technically used, signifies the separation of volatile products from wood with, at most, but little decomposition of the wood fiber.

With both these processes the vaporized compounds after leaving the retort pass through water cooled tubes, where they are condensed into the crude liquors which after refining yield marketable products. Different woods give different marketable products after distillation. Thus, the hard woods—beech, birch and maple—yield acetate of lime, wood alcohol and charcoal, and long leaf pine yields turpentine, tar, pine oils and charcoal. This difference in the products is due to the fact that pine woods are resinous, while hard woods are nonresinous. From the point of view of products, therefore, it is necessary to distinguish between the kinds of wood used, as well as between the distillation processes.

Hard wood distillation has been an established industry in the United States for a number of years. The products already mentioned are wood alcohol, charcoal and acetate of lime, each of which has important uses. The plants are located in the northern part of the United States, where, except for the Appalachian hard wood belt, the hard woods are most common. The woods used are largely beech, birch and maple, with the last preferred. The wood is cut into cord wood lengths and allowed to season for a year. According to the best information, the amount of the products obtained from green wood and from ordinary dry wood is not different, cord for cord, but the higher water content of green wood dilutes the distillate and necessitates more fuel for the carbonization. Excessive seasoning will doubtless reduce the yield of valuable constituents. Body wood is better than slab wood. Very small wood, such as thin edgings, carbonizes so rapidly that it must be mixed with larger pieces. The problem of the destructive distillation of sawdust has not yet been satisfactorily solved.

Apparatus of Hardwood Distillation.

Wood is heated or carbonized in three forms of apparatus: (*a*) In brick kilns, (*b*) in retorts, (*c*) in ovens.

The charring of wood is a process as old as civilization. In the early days the wood was charred under sod in the old charcoal kiln, which has been a familiar sight over a good part of the world. The modern charcoal kiln is so made that valuable vapors are condensed from the smoke, which in the old-fashioned kiln escaped into the air and were wasted. Kilns are now mainly used to produce charcoal for blast furnaces for pig iron. They are made of brick, with a circular base, and divided approximately into two semicircular sections. They hold each about 50 cords, and are charged and discharged by hand. The vapors are carried off into condensers, where the condensable ones are liquefied.

The name "retort" is given to a small form of cylindrical vessel holding about three-fourths of a cord. The retorts are set horizontally in brickwork in pairs, each pair forming a "battery" and heated from beneath. They are filled and discharged from a single door in front, which can be tightly fastened. The top of the battery is often tiled and serves as a drying floor for acetate of lime. The condensers are of copper, and are cooled by water. A "run," from charging to recharging, takes 24 hours.

The invention of the "oven" form of carbonizing vessel marked a distinct forward step in wood distillation. Oven kilns are made large enough to hold from two to four cars, which are run in on tracks, each loaded with about two cords of wood. They are usually fired separately, and the vapors pass over into the condensers either at the side or at the end. In other respects they resemble the "retorts."

Products of Hardwood Distillation.

Four crude products are obtained from each of these forms of carbonizing vessels: (1) Charcoal, which remains in the vessel; (2) a noncondensible gas, which is carried off by suitable pipes; (3) an aqueous liquor known as pyroligneous acid; and (4) wood tar, which is condensed with the pyroligneous acid.

The charcoal is cooled differently in the case of each distilling vessel, though in all cases it is cooled for 48 hours. With kilns, it is allowed to cool before being removed; with the retorts, it is shoveled into drums or cans and sealed from the air; and with the ovens, the loaded cars are run out and closed in large coolers, which are similar in form to the ovens.

The gas from the kilns is piped back into the kiln furnaces, where it serves to carbonize the wood. The gas from retorts and ovens is burned under the boilers or under the retorts.

The pyroligneous acid and the tar run off together from the condensers into vats, where the tar settles. The pyroligneous acid is reddish brown in color and has a strong, characteristic burnt wood odor. The tar, when in thin layers, is dark brown in color, and has a bad odor. These two liquid products are refined by processes which in general are the same for each of the three forms of carbonizing apparatus. The processes differ somewhat, however, at the different plants.

Dissolved in the tar are some of the valuable compounds of the pyroligneous acid, while dissolved in the pyroligneous acid are some tarry bodies. Both liquids are distilled in order to concentrate the valuable substances, which are chiefly acetic acid and methyl, or wood, alcohol. The concentrated liquid containing the acetic acid and methyl alcohol is neutralized with lime and distilled from a "limelee" still, giving (1) a residue which upon evaporation yields gray acetate of lime, and (2) a distillate which upon refining yields the various grades of wood alcohol.

Some plants obtain a crude, brown, evil smelling wood alcohol, of 82 per cent. strength, which is sent to a refinery for further treatment; others obtain a 95 to 99 per cent. product without color or unpleasant odor. Wood alcohol is ill smelling only when impure as a result of incomplete refining. Oven and retort plants which produce alcohol no purer than 82 per cent. secure about the following average yields from wood distillation per cord of wood:

Charcoal	45 to 52 bu.
Gray acetate of lime	180 to 225 lb.
Wood alcohol, 82 per cent.	8 to 10 gal.

The lack of chemical supervision at the works makes statements of yield a little confusing, since wood alcohol and acetate of lime are variable in quality and the number of gallons and pounds may therefore actually represent products of quite different composition. Kiln plants obtain about the following yield per cord of wood:

* From Circular 114 of the Forest Service, United States Department of Agriculture.

Charcoal	45 to 52 bu.
Acetate of lime	90 to 150 lb.
Wood alcohol, 82 per cent	4 to 6 gal.

Use of Products.

These compounds have a variety of uses, which may be briefly mentioned. Charcoal is used in blast furnaces for the production of pig iron, in copper and sugar refineries, in the production of gunpowder, for fuel, &c. Wood alcohol is sold under a variety of trade names, such as "columbian spirit" and "colonial spirit." It is most widely used as a solvent in the production of shellacs and varnishes. It is also used in hat making, in perfumery, in the coal tar dye industry, in manufacture of formaldehyde, and for mixing with grain alcohol to produce "denatured" or "industrial" alcohol. The acetate of lime is a gray, finely crystalline body, which is used in the manufacture of wood vinegar, acetic acid, many commercial acetates, acetic ether, acetone and other products. From the acetone may be produced iodoform and chloroform.

A number of receipts for the preparation of denatured alcohol have been recently authorized by Congress and established by the Commissioner of Internal Revenue, so that denatured alcohol, with its due admixture of wood alcohol, is now a market article. The wood distillation plants now in existence in the United States are able to produce probably 30,000,000 gal. of wood alcohol annually. Denatured alcohol is now a competitor of wood alcohol. At present the producers and refiners of wood alcohol are in suspense as regards the extent of the consumption of the product for denaturing purposes.

[The second part of the circular is devoted to the destructive distillation and steam distillation of yellow pine, with production of charcoal, gas, light oils, tar and pyroligneous acid from the former and of turpentine from the latter. The pyroligneous acid from yellow pine distillation is of such different composition from that secured from hard wood that little is done with it. The yield from a cord of pine wood is not more than 3 gal. of 82 per cent. wood alcohol and about 70 lb. of brown acetate of lime. The extraction of wood alcohol from pine wood is not at present on a commercial basis, and at the majority of plants the pyroligneous acid runs to waste. The ordinary yields per cord of wood in the destructive distillation of yellow pine are given as follows: Refined turpentine, 7 to 12 gal.; total oils, including tar, 50 to 75 gal.; tar, 40 to 60 gal.; charcoal, 25 to 35 bu.—Editor *The Iron Age.*]

The Production of Antimony in 1906.

By far the greatest amount of antimony produced in the United States from domestic ores is that contained in antimonial lead. For 1906 a production of 10,546 net tons of antimonial lead, containing 1362 tons of antimony, was reported by the refineries of the country. It is estimated that about one-fourth of this was produced from foreign ores, so that the production from domestic ores was about 1021 tons. This quantity was about half that produced in any year for the preceding five years and was less than the trade requirements, so that metallic antimony was melted with lead to supply the demand.

Antimony combines readily with many metals, from some of which it may be easily volatilized under the heat of the blowpipe. Antimony has the property of hardening lead when melted with it, and in the smelting of antimonial ores much hard lead is produced. Alloys of antimony and lead expand on solidifying and make excellent metal from which to cast type, since it will fill the corners of mold. Type metal contains varying quantities of antimony, generally less than 40 per cent. alloyed with tin, lead and sometimes copper, zinc, bismuth and nickel. Britannia metal and pewter, formerly much used for tableware, are also alloys containing antimony. Most of the antimonial lead, however, was used in making antifriction metals.

Up to the present time the United States has been but a small producer of antimony, owing to the low price of the metal, to the distance of the known domestic deposits from market, and to the low cost of production from extensive deposits in other countries. Hence it has been only in times of high prices that the deposits in the United States could be worked at a profit; and although there is a constant increase in transportation facilities and the metallurgy of antimony is becoming better known, it does not seem likely that there will be much increase in domestic production in the near future.

The remarkable rise in the price of antimony which began in 1905 continued in 1906 and stimulated production greatly, but toward the end of the year the price fell. Sudden changes in price, however, have been common in the history of the antimony market.

The production of antimony in 1906 is reported by Frank L. Hess, geologist, of the United States Geological Survey, in an advance chapter from "Mineral Resources of the United States, Calendar Year 1906," now ready for distribution by the Survey. Mr. Hess describes the antimony ores occurring in various parts of the United States and gives import statistics as well as figures showing the domestic output.

The Rivers and Harbors Congress.

The National Rivers and Harbors Congress met in Washington, D. C., December 5, with a large attendance from all parts of the country. Among the speakers on that day were Governors William O. Dawson, West Virginia; Robert B. Glenn, North Carolina; John A. Johnson, Minnesota; Braxton B. Comer, Alabama; Albert B. Cummins, Iowa, and Lieut-Gov. A. B. Davidson, Texas. The chief interest centered in the address of President J. J. Hill of the Great Northern Railroad. Mr. Hill has been credited with being opposed to river and harbor improvements, and his address was regarded as an outline of the attitude that may be expected from the great railroad interests on the river and harbor question. He said:

> The railroads of the country will welcome the development of a national system of waterways which will open the choked avenues of commerce. There will be plenty of business for the railroads at profitable rates after the deeper waterroads of the country are developed. The railroads of the country have never been opposed to a systematic and reasonable development of the rivers and harbors of the country.

President Hill strongly advocated the improvement of the Mississippi River. In his opinion, a depth of at least 15 ft. should be created in the river from St. Louis to New Orleans. He said 18 ft. would be worth twice as much as 15 ft., and 21 ft. would be a reasonable improvement. Mr. Hill thought that the Mississippi River should be made the center of a national system of waterways and that work should begin first on that project.

J. Hampton Moore, president of the Atlantic Deeper Waterways Association, was called upon and expressed his appreciation of the fact that the railroad president had joined the ranks of the river and harbor advocates, but took issue with him on the suggestion that the congress should favor the inauguration of the work on the Mississippi, claiming that each locality should be allowed to work out its own salvation, and that the congress should confine its efforts to the advocacy of a general policy.

Theodore H. Burton of Ohio, chairman of the Rivers and Harbors Committee of the House of Representatives, said:

> This is a great national policy which we are advocating which must not be divided in proportion to the population or the wealth of States. In my opinion we should avoid the making of dribbling appropriations for any particular project, but once a project is begun it ought to be finished.

On the second day the report of the Committee on Resolutions urging that Congress appropriate at least $50,000,000 annually for 10 consecutive years was unanimously adopted. The resolutions suggest a bond issue of $500,000,000 to cover the entire period. A committee of the vice-presidents of the congress called on Speaker Cannon and presented the resolutions. He assured them that he was in hearty accord with the spirit of the resolutions and promised his support. In reviewing the progress made in the last quarter of a century, Speaker Cannon said that $172,000,000 had been appropriated for river and harbor improvement, and that additional contracts had been let to the total amount of $236,000,000.

Canadian Manufacturers Ask More Protection.

TORONTO, December 7, 1907.—Canadian trade has slackened sufficiently to give a new impulse to the demand for more protection. Though manufacturers have never ceased to impress on the Government the contention that the tariff is not adequate for the needs of home industry, their insistence on the point in their numerous representations to the Government within the last 10 years has generally been prompted less by actual experience of distressing foreign competition than by a desire to be forearmed against slaughter prices in times of trade reaction. With the exception of the woolen industry and a few other departments of production that might be mentioned, manufacturing in Canada has enjoyed high prosperity since the opening of the century, and in most lines it has steadily thrived since the middle of the last decade of the nineteenth century. For at least the last 10 years the natural industries have flourished greatly, especially farming, which, besides being favored with fine crops, had the advantage of much higher selling prices than those holding in the late eighties and early nineties. As the same period was one in which the purchasing power of the people of the United States expanded enormously, the manufacturers of the latter country had no large surplus to dispose of in this market every year. It was realized by Canadian manufacturers that their comparative immunity from American competition in their home market was due to the insatiable American demand and not to the tariff. But Canadian manufacturers steadily took thought for the future, and kept urging the Government to get the tariff in order against the time of trade depression when a tide of imports from the United States would be sure to set in.

Of late it seems that United States manufacturers have increased their interest in the Canadian market. Canadian manufacturers are becoming aware not only of a shrinkage in the volume of the demand, but also of a new aggressiveness in the competition of American traders. This has led to the issue of the following circular by the Tariff Committee of the Canadian Manufacturers' Association:

Undervaluation of United States Goods.

Owing to the present financial stringency in the United States a large number of firms are, it is stated, being compelled to realize quickly on their stocks of manufactured goods. These stocks are necessarily sold at a sacrifice, and it is only natural to suppose that the firms affected will attempt to unload them in Canada rather than demoralize their own market by reducing prices to the home consumer.

That they have already begun to do so, and on a large and systematic scale, is the conclusion your Tariff Committee has come to in the light of information recently received. Manufacturers in various lines and in various localities are beginning to complain of the effects of sudden and undue competition from the United States. Imported goods are being offered to the Canadian consumer at prices which leave no room for doubt that they have been dumped upon this market.

It is not intended that this statement should reflect in any way upon the vigilance of our customs officials. We believe that they are doing everything in their power to see that the dumping regulations are enforced, but we know how impossible it is for them to judge accurately the value of all classes of goods. Furthermore, we know how easy it is for those who wish to evade the dumping duty to do so.

In order, therefore, that the hands of the department may be strengthened, we would urge you to report fully and promptly to the Minister of Customs at Ottawa all cases of undervaluation that come under your observation. By this we do not mean that you should report what may be only hearsay or idle suspicion, for this might result in annoying delays to perfectly legitimate entries. But if you are reasonably sure that your suspicions are well grounded, even though it may be impossible for you to furnish absolute proof, please report the case to the department, who will make it their business to investigate. If, at the same time, you will furnish the association with a copy of your complaint, the Tariff Committee will undertake to see that it is followed up.

This is a matter in which all are interested, more particularly at the present time when business is somewhat depressed, and it is earnestly hoped, therefore, that you will co-operate with the committee to the fullest extent.

The circular, dated November 30 at Toronto, is addressed to members of the Canadian Manufacturers' Association, and is signed by the chairman, P. W. Ellis, and the secretary, G. M. Murray.

A Standing Tariff Commission.

The Executive Committee of the Canadian Manufacturers' Association met in Ottawa on Thursday. A deputation representing the Railway Transportation Committee of the Executive Committee called on Sir Wilfrid Laurier and presented the resolution adopted at the last meeting in favor of strengthening the Board of Railway Commissioners and the subdividing of its work. The Government had previously announced its intention of acting in accordance with the resolution, and a bill to add to the number of the Railway Commissioners and to provide for the more expeditious handling of questions referred to it from the West will be introduced this session.

The business that occupied the chief attention of the Executive Committee at this Ottawa meeting was the subject matter of the circular quoted above. A proposal, broached to the Government by the association when the tariff was last under revision, was discussed at this meeting and was again approved. This was the suggestion that a permanent Tariff Commission be established by the Government, similar in constitution to the Railway Commission. If the Government should adopt this idea the Manufacturers' Association would be prepared to assist the commission by means of a tariff branch of the association. That branch would be put in charge of the most capable expert obtainable and manned with an adequate staff. The function of this organ of the association would be to collect all facts bearing on the tariff question in Canada and to submit these to the commission.

Agriculturists on the Tariff.

At the time the Executive Committee of the Canadian Manufacturers' Association was discussing more effective measures at Ottawa, the Dominion Grange was passing antiprotection resolutions in annual meeting in Toronto. This agricultural association met on Thursday and Friday. On Thursday its Legislative Committee submitted a report on the tariff, which was adopted. After dwelling on the fact that the average rate of duty on goods subject to customs taxation is 27 per cent. ad valorem, the duty being in some cases as high as 50 per cent., the report proceeds:

The issue raised by the Manufacturers' Association must be fairly met by the Grange, as representing the farmers of Canada. Farmers were prepared to accept the recent revision at least as a truce in the battle for reasonable fiscal legislation. The manufacturers, who gained most by that revision, in that they retained under it an unduly high scale of protection, have broken the truce. The puling infant that asked for temporary and moderate protection thirty years ago is now a giant demanding that practical prohibition of foreign competition in manufactured goods shall be the permanent policy of this country. This demand must be met by the counter-demand that the protective principle shall be wholly eliminated, and the tariff reduced to a purely revenue basis. Industries that have had the advantage of 30 years of protection, which have the constant advantage of nearness to market, and are promised the further benefits of electric power at a cost much below that produced by steam from coal, should be able to stand alone. And what they may reasonably be expected to do they ought to be compelled to do.

On the subject of iron and steel bounties the language of the committee's report was equally condemnatory.

C. A. C. J.

The Avery Mfg. Company, Peoria, Ill., manufacturer of threshing machines, agricultural implements, &c., has reincorporated with a capital stock of $2,500,000, of which $1,400,000 has already been paid in. This action was made necessary by the expiration of the company's former charter, and the new charter represents an increase in its stock of $1,500,000. The new capital thus provided will be devoted to extending the lines of the company and pushing its business more vigorously. Besides manufacturing thresher traction engines, the company has developed, and is now making, plowing engines, traction dump wagons and traction steam shovels. These latter lines have met with much success and will in the future receive a still larger share of attention. The present company is a development of the Avery Plant Company, organized in 1883 with a capital of $200,000. It has steadily grown, until now the plant spreads over a 23-acre site, and its buildings have a total floor space of 6½ acres.

Bar Iron—"Refined" and Otherwise.

Under the above caption the Zug Iron & Steel Company, Pittsburgh, Pa., has issued a circular which is of such general interest that it is given below:

At this time, when special attention is being directed by both railroads and manufacturers to an improved rail that will afford better protection to life and property, the occasion is opportune to suggest to master car builders, master mechanics, purchasing agents, manufacturers of locomotives and cars and those engaged in general forge and machine shop work, the importance of better knowledge of the character of the bar iron entering into this work.

In the earlier history of bar iron, used for general mechanical purposes—and by earlier history we mean the time just preceding the general use of steel—the stock that entered into its manufacture was nearly all puddled pig iron or wrought iron scrap, or a mixture of the two, *i. e.*, it was made either of best new material or of selected iron scrap, or of intelligent combination of these two to secure special physical properties. "Refined" iron was then a term applied only to all muck bar, pig iron stock, double or treble rolled. At that period scrap was practically all iron; its general character was well known, and the bar made from such stock was reasonably uniform in quality. However, with the incoming of Bessemer steel—its giant strides and the revolution it wrought in a few years in car building and general construction—there began a marked change in the manufacture of bar iron. As steel could be produced cheaper, the efforts of manufacturers were directed to the cheapening of iron to keep it fairly competitive; and the cheapening process was at the expense of quality and of what gave iron its special value in mechanical work as a uniform forging material. The result is that to-day bar iron is almost as varied in its character as the number of mills that produce it, and trade designations or expressions that were in earlier times an index of character are now mere commercial phrases.

To-day the word "refined" does not belong to any one grade or class of iron; it is simply a comparative term, and its value is different in different mills, according to their practice or the material employed. Steel scrap now is, of course, much more plentiful and generally cheaper than wrought iron scrap. Many mills to-day make "common" or "merchant" bar iron of cheapest grades of mixed steel and iron scrap. By selecting their scrap they make what they represent as "refined" bars; and, by still more careful selection and precaution in rolling, make what they sell as "double refined," and yet all these different grades are made of common iron material. Another mill, with an entirely different class of trade, will furnish under the same trade names an entirely different class of material. The term "refined" is therefore meaningless, as a general trade expression; and the term "muck bar" is almost as misleading.

Muck bar can be, and is, made in very large quantities of nondescript material. Old grade bars, stove plate and other cheap castings of various kinds enter largely into its composition. Sometimes this is puddled alone; sometimes with the addition of a proportion of new pig iron. This varied material, puddled and rolled into usual muck bar sections, represents the majority of muck bars quoted in trade journals and sold in the market as muck bars. Bar iron rolled from this stock could be properly termed "muck bar iron," and yet it will be very apparent that such bars would be radically different in quality and uniformity from iron made exclusively of best brands of pig iron, selected with a view of securing best possible results in forging and mechanical work. With the latter, quality and uniformity can be safely guaranteed, for the manufacturer knows his metals and their general analyses. With the stove casting grate bar product no such guarantee could be maintained, for no one could guess the exact outcome of such mixture; and yet it could be presented to a buyer as an all muck bar iron, and guaranteed as such.

We therefore repeat the suggestion offered at the beginning of this circular—that, in this day of widely differing prices, for ostensibly the same material, at least material under the same general trade terms—it behooves the buyer, or the man who is responsible for security and good work, and who wishes to measure up to his responsibility, to learn the exact value of these mere trade expressions, and to learn where he can secure just what he requires; the cost of such safeguard and its ultimate economy.

New Publications.

Commercial Precedents.—By Charles Putzel of the New York Bar. Publisher, American Publishing Company, Hartford, Conn. Pages, 776. Price, English cloth, $4; leather, $5.

This volume consists of reprints from the Department of Replies and Decisions of the New York *Journal of Commerce and Commercial Bulletin*. The author has been in active practice of the law since 1878, and is located at 299 Broadway, New York City. He is one of the Tax Commissioners for Greater New York. In 1881 and 1887 he edited books on commercial law for the American Publishing Company and the New York *Journal of Commerce*. Having had a long and varied commercial legal experience, he possesses the essential qualifications for furnishing information of this general and useful character. The number of topics discussed is very great, as will be seen by the following partial list of subjects which are treated: Accounts and Accountings, Acknowledgments, Administrators, Admiralty, Adverse Possession, Agents, Aliens, Appraisals, Arbitration, Assignments, Associations, Attachments, Attorney and Client, Auction, Bailments, Banks and Banking, Bankruptcy, Bequests, Bills, Bonds, Bookkeeping, Brokers and Brokerage, &c. The contents are arranged in the form of questions and answers, and a careful classification has been made under subjects, so that the treatment of any particular subject is easily found by reference to a copious index. There is a peculiar value in this volume from the fact that it is not in any sense theoretical or the statement merely of general principles of law, but, on the other hand, is eminently practical, inasmuch as all the questions, more than 1500 in number, the answers to which constitute the body of the work, came up in actual course of business. The book also gives a glossary of legal terms and definitions, and a number of pages are devoted to legal business forms.

The Mechanical World Pocket Diary and Year Book for 1908.—Publishers, Emmott & Co., Ltd., 65 King street, Manchester, England. Pages 390. Cloth bound. Price, sixpence net.

This is the twenty-first year of publication of a most convenient book for the use of mechanical engineers. It contains practical information on a great variety of subjects in connection with engineering work, including numerous tables of reference. While many of the tables give English standards, the great bulk of the information is equally valuable to American and English engineers. About one-fourth of the book constitutes a diary, with sufficient space under the printed days of the week for considerable memoranda.

Labor Notes.

Mexican workmen are endeavoring to organize on lines similar to those laid down by labor organizations in others countries. A meeting of delegates from various branches of labor throughout the republic is to be held in the city of Mexico in January to perfect the organization of a great union similar to the American Federation of Labor in this country. Hitherto Mexico has been comparatively free from labor troubles, but this movement indicates the probability that our sister republic is destined to have its labor problem to solve in common with other countries making rapid industrial progress.

Notices of an "open shop" policy have been posted in all the foundries and machine shops in Portland, Ore., effective December 1. The metal trades are strongly organized there, and up to the present time have controlled the shops so far as the employment of mechanics, hours of labor and wages are concerned.

Pig Iron Output Cut Sharply.

Seventy-eight Furnaces Go Out in November.

Active Weekly Capacity Reduced by 144,064 Tons.

Many more blast furnaces crowded upon the idle list in November, accelerating the restrictive movement that began in October. No less than 78 were blown out or banked between November 1 and December 1. The production of coke and anthracite iron in November was 1,828,125 tons, as against 2,336,972 tons in October. Of the falling off of 508,847 tons, 430,407 tons is due to the curtailment of production by Northern steel works, while 78,440 tons represents the decline in production of merchant furnaces. Since the blowing out of furnaces was in progress throughout November the comparison of active capacity on November 1 and December 1 is a better measure of the way in which the furnace interests have responded to the trade conditions forced by the financial crisis. On November 1 the capacity of the coke and anthracite furnaces in blast was 491,436 tons. On December 1 it had fallen to 347,372 tons, a decrease of 29 per cent. The movement is still in progress and January 1 may be expected to show a still lower figure. A number of furnaces have gone out of blast since December 1 and in other cases it has been definitely decided to blow out this month.

Of the 78 furnaces going out in the month preceding December 1, 46 were steel company furnaces and 32 were merchant furnaces. The Central West has naturally been the leader in the cutting down of production. In the table below a statement is given of the relative participation of the East, the Central West and the South. The Eastern group takes in the coke and anthracite furnaces of New York, New Jersey and the Lehigh, Schuylkill, lower Susquehanna and Lebanon valleys in Pennsylvania. In the Central Western group are the furnaces of the Pittsburgh District, western Pennsylvania (including the Shenango Valley), the Wheeling District and northern and central Ohio. The Southern group takes in the furnaces of Virginia, Kentucky, Alabama, Tennessee, Georgia and Texas:

	December 1.		November 1.		October 1.	
	No.	Weekly capacity.	No.	Weekly capacity.	No.	Weekly capacity.
The East	53	58,812	67	77,000	79	87,475
The Central West	85	181,420	122	273,490	135	287,963
The South	49	42,234	60	51,960	65	52,459

Since October 1, 65 steel works furnaces have blown out and 2 have blown in. The net loss in merchant furnaces in the same time has been 34. The table below gives the production of coke and anthracite furnaces in November and the four months preceding:

Monthly Pig Iron Production—Gross Tons.

	July. (31 days)	August. (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)
New York	155,658	150,385	150,264	152,710	111,407
New Jersey	34,633	35,026	32,877	30,574	24,079
Lehigh Valley	61,854	60,160	68,559	71,936	61,969
Schuylkill Val.	60,035	59,807	53,978	48,543	43,876
Lower Susquehanna and Lebanon Val.	61,279	64,456	59,580	67,286	47,683
Pittsburgh Dis.	534,668	525,341	509,497	533,078	409,024
Shenango Val.	167,319	152,917	144,978	158,315	124,159
West. Penn	129,887	129,922	133,906	143,078	130,192
Md., Va., and Kentucky	86,496	84,462	81,398	86,829	79,293
Wheeling Dis.	108,659	121,078	117,445	134,445	76,014
Mahoning Val.	172,704	177,438	162,644	180,968	129,334
Central and North. Ohio.	179,987	176,700	164,314	185,422	149,362
Hocking Valley and Hanging Rock	34,050	35,590	32,138	33,843	28,017
Mich.,Minn.,Mo., Wis., Colo.	76,902	77,961	79,112	81,155	59,697
Chicago Dis.	216,915	215,641	212,413	244,645	200,309
Alabama	136,936	144,374	142,766	146,354	118,190
Tennessee, Georgia and Texas	37,678	39,152	37,618	37,791	35,520
Totals	2,255,660	2,250,410	2,183,487	2,336,972	1,828,125

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland and Colorado companies show the following totals of products month by month. We give separately a statement of the output of spiegeleisen and ferromanganese, which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1905.	1906.	1907.	1906.	1907.
January	1,129,042	1,358,015	1,406,397	26,305	21,477
February	1,027,937	1,226,760	1,317,923	26,988	19,444
March	1,232,255	1,400,395	1,424,827	23,595	31,091
April	1,222,710	1,333,591	1,446,788	28,054	26,527
May	1,287,438	1,372,423	1,470,080	29,447	28,822
June	1,149,404	1,293,437	1,457,230	22,737	30,942
July	1,114,409	1,323,391	1,452,557	20,153	25,343
August	1,186,050	1,237,485	1,445,685	18,327	23,696
September	1,262,033	1,264,380	1,417,153	24,078	30,270
October	1,370,960	1,452,200	1,514,521	23,517	35,105
November	1,334,644	1,411,350	1,084,114	29,119	21,861
December	1,356,962	1,445,528	.....	21,707	.....

The table below gives the weekly capacity of coke and anthracite furnaces in blast December 1 and November 1:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	December 1. Number in blast.	December 1. Capacity per week.	November 1. Number in blast.	November 1. Capacity per week.
New York:					
Buffalo	14	8	17,845	12	26,642
Other New York	10	4	5,105	5	5,817
New Jersey	8	5	4,846	6	6,785
Spiegel	2	0	0	0	0
Pennsylvania:					
Lehigh Valley	25	16	12,742	19	15,078
Spiegel	3	2	608	3	1,013
Schuylkill Valley	14	8	6,845	10	10,241
Spiegel	1	1	730	1	410
Low. Susquehanna	8	5	6,709	5	6,064
Spiegel	1	0	0	1	676
Lebanon Valley	8	4	3,382	5	4,274
Spiegel	2	0	0	0	0
Pittsburgh Dist.	45	26	72,843	38	109,249
Spiegel	3	2	1,452	3	2,850
Shenango Valley	20	12	21,861	18	34,749
West. Penn	27	20	30,242	22	30,726
Maryland	4	3	6,155	4	7,987
Wheeling Dist.	14	4	6,935	10	22,582
Ohio:					
Mahoning Valley	18	10	20,267	16	35,911
Central and North. and Michigan	22	13	30,270	17	39,923
Hocking Valley and Hanging Rock	12	9	4,891	11	7,644
Illinois and Indiana	23	16	40,625	23	53,896
Spiegel	2	1	910	2	1,701
Minnesota	1	1	730	1	1,176
Wisconsin	6	3	3,197	5	4,275
Missouri	1	1	524	1	574
Colorado	5	3	5,424	4	8,967
Spiegel	1	0	0	1	266
The South:					
Virginia	23	12	7,710	14	8,435
Kentucky	7	3	2,254	4	2,775
Alabama	46	20	24,248	28	32,427
Tennessee	18	14	8,022	14	8,029
Georgia and Texas	3	0	0	1	294
Totals	397	226	347,372	304	491,436

The list of furnaces blown out between November 1 and December 1 includes the following: Pueblo furnaces C and F, Colorado; two Buffalo, one Lackawanna, one Buffalo & Susquehanna and Franklin, in New York; one Wharton, in New Jersey; two Henry Clay and one Warwick, in the Schuylkill Valley; one Allentown Rolling Mill, two Thomas Iron Company and one Palmerton, in the Lehigh Valley; three Edgar Thomson, one Duquesne, one Carrie, one Lucy, one Clairton, one Donora, three Isabella and two Monongahela, in the Pittsburgh District; one New Castle, Sharon, one South Sharon, Atlantic, Hall and one Shenango, in the Shenango Valley; Marshall in western Pennsylvania, one Paxton in the Lower Susquehanna Valley, and one Lebanon in the Lebanon Valley; Ivanhoe, in Virginia; one Sparrows Point, in Maryland; one Ashland, in Kentucky; one La Belle, three Mingo, Benwood and Riverside, in the Wheeling District; Zanesville, two Lorain and one Toledo, in Ohio; Belfont and Bird, in the Hanging Rock District; seven Illinois Steel and Federal, in Illinois; two Bay View, in Wisconsin; one Hubbard, three Ohio, Hannah

and one Haselton, in the Mahoning Valley; one Etowah, one Thomas, two Sloss and four Tennessee, in Alabama, and Rising Fawn, in Georgia. The only furnace reported blown in in November was No. 3 Brooke in the Schuylkill Valley.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1903:

	Capacity per week.		Capacity per week.
December 1	347,372	June 1	443,092
November 1	491,436	May 1	452,031
October 1	511,397	April 1	439,564
September 1	507,768	March 1	403,157
August 1	513,471	February 1	405,792
July 1	528,170	January 1, 1905	377,879
June 1	523,220	December 1, 1904	357,846
May 1	524,538	November 1	334,249
April 1	496,456	October 1	319,249
March 1	511,035	September 1	291,573
February 1	492,359	August 1	246,092
January 1, 1907	507,397	July 1	272,301
December 1, 1906	513,860	June 1	336,107
November 1	500,580	May 1	368,244
October 1	469,665	April 1	337,257
September 1	441,426	March 1	308,751
August 1	449,908	February 1	273,692
July 1	460,570	January 1, 1904	185,636
June 1	472,622	December 1, 1903	244,156
May 1	484,031	November 1	273,715
April 1	484,240	October 1	353,142
March 1	479,737	September 1	360,197
February 1	482,156	August 1	353,681
January 1, 1906	463,673	July 1	384,825
December 1, 1905	475,814	June 1	388,178
November 1	460,449	May 1	373,496
October 1	445,468	April 1	386,215
September 1	412,563	March 1	347,424
August 1	410,088	February 1	335,239
July 1	408,617	January 1, 1903	346,073

Berg Slag Ladle Cars for Australia.

The William B. Pollock Company, Youngstown, Ohio, builder of steel plate construction for blast furnaces and steel works, and also sole manufacturer of the P. T. Berg cinder and hot metal cars, recently made a shipment to Australia of four exceptionally large slag ladle cars. The shipment was out of the ordinary in several respects. The cars are for the Great Cobar Company, Ltd., of London, and will be put in service at the company's extensive silver and copper works in the interior of Australia, for hauling molten slag from the smelting furnaces.

The cars are standard gauge and of all steel construction, and are very large for such a purpose, having several times the capacity of cars ordinarily used for transferring smelter slag. Electrical energy is employed in dumping the ladles on the cars, an innovation introduced by the London company's American representative, the J. C. Buckbee Company, engineer, of Chicago, which is in charge of the British corporation's interests in the execution of a large smelting project in Australia. The cars were all built up completely in the Pollock Company's works and successfully tested under conditions similar to those under which they will operate abroad. They were then taken apart and nested for export shipment, the several parts of each car making a complete carload. Shipment was made in four cars to New York, where they were loaded aboard vessels for their voyage around half the globe.

The Carp Furnace of the Cleveland Cliffs Iron Company, at Marquette, Mich., is out indefinitely, on account of the dullness in the charcoal pig iron trade, and the Zenith Furnace at Duluth, Minn., will probably go out soon for relining. Most of the remaining furnaces around Lake Superior, all of them charcoal except those at Sault Ste. Marie, are still active. The Sault furnaces and rail mills are busy with work booked well ahead.

A few weeks since prices for merchant pipe in the international markets suffered a decline, due to dissatisfaction with the terms of the international agreement. The differences have now been adjusted and prices have been restored to their normal level.

NEWS OF THE WORKS.

Iron and Steel.

The Lackawanna Steel Company has three of its seven furnaces at Buffalo, N. Y., out of blast and all are undergoing repairs.

The La Belle Iron Works, Steubenville, Ohio, blew out one of its two furnaces November 30 for relining. It will be blown in again as soon as the work is completed.

The West End Furnace Company is making extensive improvements on its furnace at Roanoke, Va. These include the installation of a Baker top, a new skipway and skip engines and changes in the water supply. New heaters and condensers are being provided in the power plant. The relining of the stoves is also in progress.

The Longdale Iron Company's furnace at Longdale, Va., will probably be blown out some time this month.

The Bellefonte Furnace Company will bank its blast furnace at Bellefonte, Pa., as soon as December orders are filled.

The Cambria Steel Company, which now has two of its eight furnaces at Johnstown, Pa., out of blast, will probably curtail production further in December, but no definite date for blowing out has been fixed.

The Benson Mines Company has been operating its iron ore property at Benson Mines Post Office, N. Y., on single turn for some time, producing about 250 tons of concentrates a day. The company now has on the way additional steam shovel and quarry equipment, upon the installation of which it will go on double turn, producing 500 tons of concentrates a day. Recently contracts were taken for a tonnage sufficient to keep the plant in operation on double turn for some months, and the company is arranging for a further increase in its capacity.

The Upson Nut Company's blast furnace at Cleveland, Ohio, will be banked for the next 10 days or two weeks for the changing of some steam lines and connecting a new stove.

The Marting Iron & Steel Company, Ironton, Ohio, will probably bank its blast furnace in the latter half of the month if conditions do not improve, but if this is done it will be with the expectation of resuming operations in the beginning of the new year.

The Iroquois Iron Company is still running both its furnaces at South Chicago, Ill., but it is probable that one will be blown out some time this month.

The Spring Valley Iron & Ore Company blew out its furnace at Spring Valley, Wis., last week. It does not require relining or repairs.

The No. 2 Furnace of the Warwick Iron & Steel Company, Pottstown, Pa., will go out of blast about December 20. This will leave only the company's No. 3 Furnace in operation.

Richard Heckscher & Sons Company will blow out its No. 2 Furnace at Swedeland, Pa., for extensive repairs in the latter part of this month.

The second Henry Clay Furnace at Reading, Pa., was blown out November 12 by the Empire Steel & Iron Company. The other furnace had gone out in October. The company blew out its Topton Furnace, at Topton, Pa., this week. The operation of its other furnaces depends upon market conditions as developed in the remainder of the year.

Furnace A of the Toledo Furnace Company, Toledo, Ohio, which was blown out December 1, is being relined.

The Bethlehem Steel Company, South Bethlehem, Pa., blew out one of its blast furnaces last week and will reline it. A second furnace of this group will be blown out for relining within the next three or four weeks.

The Tennessee Coal, Iron & Railroad Company blew out four furnaces in November, three at Bessemer, Ala., and Alice at Birmingham. The three Bessemer furnaces were on foundry iron and Alice Furnace on basic. The company now has in operation five furnaces at Ensley and one at Bessemer. The idle furnaces are all in fair shape, so that repairs will not be necessary.

The Colorado Fuel & Iron Company blew out Furnace B at Pueblo, Colo., November 1 for relining. Furnace C went out for repairs November 16 and will resume about December 10. Furnace F was blown out November 18.

The furnace of the Central Iron & Coal Company at Holt, Ala., was blown out last week for repairs, which it was expected would take about 10 days.

Construction work on the blast furnace of the Wickwire Steel Company, on the Niagara River, north of Buffalo, is progressing satisfactorily. Much of the masonry work has been completed and the erection of the structural iron work has been started and will be continued through the winter. About 200 men are employed in the different lines of building at the plant. The company expects to have it completed and in operation by spring or early summer.

The James A. Spargo Wire Company has moved into its new wire mill in East Rome, N. Y., the main building of which is 100 x 300 ft. and the power house 60 x 100 ft. The buildings

are of steel construction with concrete flooring and will about double the present capacity. The old plant on East Dominick street will be used as a storehouse. At present the company employs 100 hands and as soon as the financial situation clears up this number will be materially increased.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, is adding four soaking pits to provide for an increase in Bessemer steel capacity.

The Firth-Sterling Steel Company, Pittsburgh, Pa., has increased its capital stock from $800,000 to $1,000,000.

General Machinery.

The Virginia Iron, Coal & Coke Company, Bristol, Va., is operating limestone quarries at Nile Siding and Ordway Siding, Va., the output being used in the company's furnaces. The crushing equipment of these two quarries consists each of a No. 8, style K, Gates breaker, together with a No. 6, style B, Gates elevator, 39 ft. 6 in. center, and a steel chute screen. Two new 40-in. x 14-ft. Gates iron frame revolving screens have recently been ordered for these plants to replace the chute screens, and they will be used particularly to take out sand and dust from the crushed product. It is the intention to use a steam shovel at each of the quarries to take up material for feeding the crushers. The entire crushing, elevating and screening equipment of these two quarries was built by the Allis-Chalmers Company, Milwaukee, Wis.

The machine shops of the Butte, Anaconda & Pacific Railroad at Anaconda, Mont., are being enlarged by a structural steel addition 40 x 75 ft. A new electric crane is also to be installed in the shops, and the shop motive power is being changed from steam to electricity.

The Spengler Brothers Company, Rockford, Ill., has been incorporated with a capital stock of $20,000 to do a general machine shop business. The incorporators are Carles C. Spengler, Stanton A. Hyer and H. B. Siwwright.

The Indiana Co-operative Canal Company, Brownsville, Texas, has secured a contract from the Indiana-Texas Land & Irrigation Company for the erection of a one-story steel building and machinery for an irrigating pumping plant, designed to deliver about 50,000 gal. of water per minute.

George E. Chisholm, formerly connected with Shapley & Wells, Binghamton, N. Y., has opened a machine shop, which will be operated as the Binghamton Machine Tool Works. In addition to general repair work, Mr. Chisholm will manufacture the Binghamton centering machine, of which he is the inventor, and the Turner safety water alarm column. These machines are favorably known and already have a large sale.

Plans have been prepared for the new office building and car house for the Metropolitan Street Railroad, to be erected at Lenox avenue and 146th street, New York, adjoining the power station and shops. The building will be 199 x 469 ft., and will cost about $400,000. The power house and shops which were recently damaged by fire are to be completed, making the building a four-story structure as originally designed. It is understood that very little, if any, new machinery will be required for these improvements.

The Buffalo Concrete Mixer Company, Buffalo, N. Y., manufacturer of automatic concrete mixing machines, has secured new manufacturing quarters at Washington and Scott streets, where it will have enlarged facilities.

Power Plant Equipment.

The Independent Light & Power Company, Davenport, Iowa, which now has a new plant in course of construction, has decided to increase its capital stock to $1,000,000.

The Parker Boiler Company, Philadelphia, Pa., has received an order from the Winona Copper Company, Houghton, Mich., for one 268-hp. boiler, a duplicate of one installed for this company about a year ago. The Haslett Warehouse Company, San Francisco, Cal., which has been using a 150-hp. Parker boiler since 1904, has just ordered another unit of 298 hp.

Foundries.

The Columbiana Foundry Company has been incoporated at Columbiana, Ohio, with a capital of $10,000. L. A. Woodward, Youngstown, Ohio, is president. The company is erecting a plant at Columbiana, consisting of a steel and brick building 60 x 80 ft., containing a 5-ton Whiting crane, cupolas, &c., for the manufacture of a general line of gray iron castings up to 5 tons in weight. The plant has direct connection with the Youngstown & Southern Railroad, and later on will have connection with the Pennsylvania lines west, thus affording excellent shipping facilities. R. H. Mills is superintendent, and the company expects to be in operation about February 1, 1908.

The Los Angeles Foundry Company, Los Angeles, Cal., has begun work on the erection of a new foundry building, 140 x 186 ft. This building will be of steel construction, covered with corrugated iron, and the cupola platform will be made of reinforced concrete.

Bridges and Buildings.

Vollkommer & Co., Empire Building, Pittsburgh, Pa., have just installed an electric drive in the mill of the North American Steel Company, Bellington, W. Va., and are now erecting an extension to the grinding and polishing building of the Allegheny Plate Glass Company, Glassmere, Pa. They have also received the contract for the engineering work for the new concentrating and reduction plant for the United States Metal Recovery Company, near Ellwood City, Pa. This plant will be of steel construction, fireproof throughout, and the latest improvements in this line will be adopted. The machinery for crushing and concentrating will be all electrically driven and will be placed in steel platforms, independent of the structure, so as not to impart any vibration to the latter.

In order to protect its creditors the Southwestern Bridge Company, Joplin, Mo., which is capitalized at $265,000, has been placed in the hands of a receiver. The company is said to be entirely solvent.

The Temple Ornamental & Structural Iron Works, New York, whose plant is at Temple, Pa., has been placed in the hands of a receiver.

Fires.

The structural steel plant of the Kelly Brothers & Mitchell Company, Winnipeg, Man., was damaged $10,000 by fire December 6.

The machine shop of the Littleton Tool Company, Littleton, W. Va., was burned December 1, the loss being about $8000.

The plant of the Thompson-Adams Leather Company, Philadelphia, Pa., was destroyed by fire December 6, the loss being about $50,000.

The pattern shop of the Atha Steel Company, Newark, N. J., and a portion of the machine shop were burned November 30, entailing a loss of $25,000.

The breaker at the colliery of the Miner's Coal Company, near Wilkes-Barre, Pa., was destroyed by fire December 9.

The cold storage plant of Leighton, Smith & Richardson, St. Augustine, Fla., was destroyed by fire December 5.

The plant of the Kosiusko Oil Mill & Fertilizer Company, Kosiusko, Miss., was burned December 5, the loss being about $40,000.

Hardware.

The Wing & Parsons Mfg. Company, Chicago, maker of iron toys and hardware specialties, has secured the plant formerly occupied by the Continental Company at Adrian, Mich., and will move there shortly after January 1. In addition to the foundry and shop equipment now in the Adrian plant the company will transfer the machinery from its Chicago works, which will practically complete the installation.

Owing to the large demand for its vises the G. M. Yost Mfg. Company, Mechanicsburg, Pa., has found it necessary to materially increase its producing facilities, and it has accordingly been decided to move to Meadville, Pa., where a new factory building is now in course of erection. On its completion, about March 1, next, the company will remove its entire equipment to Meadville, where the offices will also be located. About $5000 worth of new tools will be added to the machinery equipment. The new plant will be one of the largest and best equipped in the country in the line of vise manufacture. The company reports business as excellent, with lots of orders on the books.

Miscellaneous.

The Berkshire Motor Car Company, Pittsfield, Mass., manufacturer of automobiles, has been placed in the hands of a receiver, as a protection to its creditors.

The Chapman Valve Mfg. Company, Indian Orchard, Mass., has increased its capital stock from $800,000 to $1,000,000.

The recent fire at the plant of the Port Huron Engine & Thresher Company, Port Huron, Mich., was of little consequence, doing but little damage to the office. None of the plant equipment was affected.

The Board of Public Service, Columbus, Ohio, will receive bids until January 14 for the construction of a garbage reduction works, to have a daily capacity of 100 tons.

At the annual meeting of the Northwestern Steel & Iron Works, Eau Claire, Wis., the capital stock was increased from $50,000 to $100,000. The company has just completed a large new plant for the manufacture of agricultural implements, gasoline engines and concrete machinery, consisting of a machinery building, implement factory, warehouse, foundry and forging room operated by electricity.

The Gadsden Car Works, Gadsden, Ala., denies that the plant will close down, and states that it has plenty of orders on hand and will enlarge the plant.

The Lenoir Car Works, Lenoir City, Tenn., with a capacity of 12 freight cars per day, is running at present, principally on repair work, employing about 400 men. The present manager, B. F. Lively, was formerly with the Southern Railway at Spencer, N. C.

The Buffalo Machine Mfg. Company has been organized at Buffalo, N. Y., and will soon be incorporated for the manufacture of a full line of fine machinery, with special reference to the jewelers' and watchmakers' trade, both for this and foreign countries, including rolling mills, lathes, polishing machines and other precision machinery. The new company has purchased a site at West and Forest avenues and will at once erect a three-story brick factory, 50 x 90 ft., which it will equip with metal working machinery of latest design, to be operated electrically with Niagara Falls power.

The Iron and Metal Trades

It is in times like these that furnace capacity figures possess much greater value than the records of actual output, because they foreshadow future make instead of recording past make. The maximum capacity in operation of the coke and anthracite furnaces was attained on July 1, with a total of 528,170 gross tons per week. On October 1 we were running at the rate of 511,397 tons per week. On November 1, 304 furnaces were making 491,436 tons per week, while on December 1 there were 226 furnaces in operation, producing at the rate of 347,372 tons per week, a drop in two months of 164,000 tons per week. We have official reports covering seven furnaces which have gone out since the first of the month, and the announcement in a number of cases that other plants will shut down.

Thus far the restriction of output has been due principally to the Steel furnaces, whose output ranged for months near 1,450,000 tons, was 1,514,000 tons in October, and dropped to 1,084,000 tons in November. The merchant furnaces, which were producing from 800,000 to 820,000 tons per month, came down to 744,000 tons in November, and will be much less this month.

The principal merchant furnace interests along the Lakes had a conference at Cleveland last Saturday to devise means to meet prevailing conditions. In the meantime transactions have been on a limited scale in the Central West, where Southern Iron has sold on the basis of $14 for No. 2 Birmingham. In the East there have been some round sales of Basic, of Foundry Forge and of Low Phosphorus Pig at a lower range of prices.

Chicago reports the placing of an order for 25,000 tons of Steel Rails for the Erie Railroad, and it is known that some other business for 1908 is pending.

Bids have gone in on the Manhattan bridge approaches, which call for 15,000 tons of Structural Material. Chicago records 15,000 tons, including 12,500 tons for Gary. In Pittsburgh, a 2000-ton contract has been placed and there is figuring going on for Seattle and Portland.

In the Eastern Plate market there is an inquiry for about 12,000 tons of Acid Open Hearth Plates, which may develop into business.

Some orders have been placed for Cast Iron Pipe, which includes 5000 tons for Chicago and 2500 tons for Phœnix, Ariz. There are inquiries for 3500 tons by gas companies, 3800 tons for Baltimore and 20,000 tons for Syracuse, for the spring.

The Old Material markets are thoroughly demoralized, and very low prices are being made. In the territory tributary to New York the leading trunk lines have lists out aggregating 100,000 tons, while in Chicago this week has brought out offerings of 17,000 tons. Prices are at a level which begins to attract the attention of exporters, and it is reported that some business in Rerolling Rails for shipment to Italy has already been done.

The metal markets are very dull. December Copper is selling, for cash, at somewhat lower figures than February Copper.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 11, 1907.	Dec. 4, 1907.	Nov. 13, 1907.	Dec. 12, 1906.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$18.50*	$18.75	$19.00	$24.50
Foundry No. 2, Southern, Cincinnati	*17.50*	18.00	19.75	25.00
Foundry No. 2, Local, Chicago	*19.00*	19.00	20.50	25.50
Bessemer, Pittsburgh	*19.90*	19.90	20.90	23.85
Gray Forge, Pittsburgh	*18.40*	18.90	19.40	22.85
Lake Superior Charcoal, Chicago	25.00	25.00	25.00	26.00
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	29.50
Forging Billets, Pittsburgh	30.00	30.00	30.00	36.50
Open Hearth Billets, Phila	30.00	30.00	30.00	33.00
Wire Rods, Pittsburgh	34.00	34.00	34.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	*13.00*	13.75	15.50	20.50
Steel Rails, Melting, Phila	*11.50*	11.50	13.50	20.00
Iron Rails, Chicago	*15.50*	15.50	19.00	28.00
Iron Rails, Philadelphia	*17.50*	17.50	19.00	27.75
Car Wheels, Chicago	*22.00*	22.00	23.00	25.00
Car Wheels, Philadelphia	19.00	19.00	19.00	23.00
Heavy Steel Scrap, Pittsburgh	*13.50*	13.50	15.00	20.00
Heavy Steel Scrap, Chicago	*11.50*	12.00	12.50	17.50
Heavy Steel Scrap, Philadelphia	*11.50*	11.50	13.50	19.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.75	1.75	1.75	1.83½
Common Iron Bars, Chicago	1.75	1.75	1.75	1.71½
Common Iron Bars, Pittsburgh	*1.60*	1.60	1.70	1.80
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.74½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.70	1.70	1.70	1.65
Skelp, Sheared Steel, Pittsburgh	1.80	1.80	1.80	1.70
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	2.00	2.00	2.00	2.05
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	*13.62½*	13.75	14.25	23.00
Electrolytic Copper, New York	13.50	13.62½	13.50	22.75
Spelter, New York	*4.50*	4.60	5.10	6.65
Spelter, St. Louis	*4.35*	4.45	5.00	6.50
Lead, New York	*4.00*	4.12½	4.55	6.12½
Lead, St. Louis	*3.75*	4.00	4.35	5.92½
Tin, New York	*28.40*	30.10	30.75	42.85
Antimony, Hallett, New York	*8.75*	8.75	10.00	25.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$4.09	$4.09	$4.09	$4.09

Chicago.

FISHER BUILDING, December 9, 1907.

In the week's developments there has been nothing of reactionary nature in the West with the exception of the Kansas City bank failures. These seem to have been of less consequence than was at first anticipated and have not seriously complicated the situation or arrested the return of confidence. While it is difficult to point to any definite feature of improvement in general conditions, other than a somewhat larger local supply of currency, a better sentiment and more hopeful feeling prevail. Trade in all branches of the Iron and Steel market is extremely quiet. Added to other influences acting in restraint of trade are the usual December slow up and the preparations for taking inventories. The latter help to emphasize the present inactivity and in consequence not much betterment is looked for before the first of the year. The reported purchase of 25,000 tons of Rails by the Erie Railroad is a hopeful sign and if followed up by liberal tonnages from other systems would lend encouragement to all industries. Of Structural Material, 12,500 tons were placed last week for the buildings at Gary, and other contracts brought the total up to 14,000 tons; and there are 2700 tons pending that will probably be placed this week. Other transactions involving tonnage of notable size were orders for Cast Iron Pipe aggregating 7500 tons. There is practically nothing doing in Pig Iron and the market is without an established price. A considerable number of inquiries for Foundry Iron covering first and second quarter deliveries have developed, but are seemingly of a purely tentative character. Scrap shares the general lethargy of other lines, and without the sup-

porting influences elsewhere effective, prices have steadily declined. The unsettled condition of the Copper market, combined with the curtailment of consumption, has resulted in an extremely quiet demand. In the absence of business prices are nominally unchanged.

Pig Iron.—The fact that inquiries for prices on Iron for forward delivery continue to come in is construed as evidence that consumers anticipate business after the first of the year, for which their present stocks are inadequate. True, very few if any of these inquiries have developed into orders; but it is reasoned that they are being made to secure a price basis upon which to figure casting contracts. The inference, therefore, is that, while of no present significance, such inquiry may presage a demand, starting from the final consumer of the product. There is practically no demand from any source for iron for present delivery. A very large percentage of the orders booked are held up and while melters' stocks are not large, at the present rate of consumption they will last in most cases well beyond the first of the year. Sales are practically limited to a few scattering car lots of special brands for mixers. As to future prices there is nothing more authentic to be offered than conjecture, since there have been no transactions that would serve to indicate what basis of values will be reached. An important furnace interest, now holding well above the market, says that when it is ready to sell Iron it will make the price with that end in view. While published quotations are of necessity only nominal, it seems from the best information obtainable that $15, Birmingham, represents the present bottom furnace price for No. 2 Foundry. The output of Merchant Iron has not up to the present time been reduced in the same proportion as steel making irons. But the prospects are that the number of idle furnaces will be considerably increased in the near future. The following prices are for December delivery, f.o.b. Chicago:

Lake Superior Charcoal	$25.00 to $25.50
Northern Coke Foundry, No. 1	19.50 to 20.00
Northern Coke Foundry, No. 2	19.00 to 19.50
Northern Coke Foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	20.50 to 21.00
Ohio Strong Softeners, No. 1	20.75 to 21.25
Ohio Strong Softeners, No. 2	20.25 to 20.75
Southern Coke, No. 1	19.85 to 20.35
Southern Coke, No. 2	19.35 to 19.85
Southern Coke, No. 3	18.85 to 19.35
Southern Coke, No. 4	18.35 to 18.85
Southern Coke, No. 1 Soft	19.85 to 20.35
Southern Coke, No. 2 Soft	19.35 to 19.85
Southern Gray Forge	17.35 to 17.85
Southern Mottled	16.35 to 16.85
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	22.40 to 22.90
Jackson Co. and Kentucky Silvery, 6 %	29.40 to 29.90
Jackson Co. and Kentucky Silvery, 8 %	31.40 to 31.90
Jackson Co. and Kentucky Silvery, 10 %	33.40 to 33.90

Billets and Rods.—There continues to be more or less inquiry for, and a few sales of, Forging Billets, but only for small lots actually needed for current requirements. Nothing has come to light in the week's transactions that would indicate any interest in crude Steel for forward delivery. The price of Forging Billets on such business as is now coming up remains at about $33 to $34, Chicago. There is little doing in Wire Rods, on which quotations are unchanged at $34 to $35, Pittsburgh.

Rails and Track Supplies.—No further movement on part of Western roads toward the purchase of Rails for 1908 delivery is reported. The fact, however, that an order of 25,000 tons for the Erie lines has been placed may be the forerunner of more activity in this line. A considerable portion of this tonnage was taken by the Carnegie Steel Company. Trade in Light Rails and Track Supplies is extremely quiet. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 2c. to 2.10c., according to delivery; Track Bolts, 2.50c. to 2.60c., base, Square Nuts, and 2.65c. to 2.75c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb. sections, $32; 20-lb., $33; 16-lb., $34; 12-lb., $35, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—More new tonnage is coming out in Structural Shapes than in most other mill products, though, at that, it is not notably large. The contracts closed during the past week by the American Bridge Company include a total of 14,000 tons, of which 12,500 tons were for an additional Open Hearth building at Gary. The remaining 1500 tons was comprised of miscellaneous orders. It is likely that the Edison-Commonwealth Company will this week close for part of the Steel required for the addition to the Fisk Street Station, amounting to 2700 tons. Rumors to the effect that the Corn Products Company had let the general contract for construction of its Summit plant are said by its representatives here to be incorrect. The Structural mills of the Illinois Steel Company are running full turn, but orders are not accumulating in a way that promises indefinite continuance at this rate. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—What new business is coming out is made up of small orders, the total tonnage of which is inconsiderable. Together with specifications in hand and those still being furnished, the local mills are fairly well supplied for the present. The demand from Structural shops for Universal Plates has helped out this department somewhat, but the mills are well caught up and can make prompt deliveries of either Universal or Sheared Plates. Prices are, in the main, firm at ruling quotations. There is, however, no inquiry for tonnage ahead. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in. up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—New business has dwindled to haphazard orders arising from urgent needs. Under present conditions these are of necessity small and add but little to incoming tonnage. So far the local mill is running full time at a little less than full capacity. Beyond a shading of not to exceed $2 a ton by a few independent mills, prices are firmly held. The uselessness and unwisdom of attempting to attract business by wholesale cutting is too apparent to tempt a resort to such measures. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, No. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c.; Sheets from store: Blue Annealed, No. 10, 2.25c.; No. 12, 2.30c.; No. 14, 2.35c.; No. 16, 2.45c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3.10c.; Nos. 18 to 20, 3.25c.; Nos. 22 to 24, 3.40c.; No. 26, 3.60c.; No. 27, 3.80c.; No. 28, 4c.; No. 30, 4.50c. to 4.55c.

Bars.—The independent mills in this district are operating either intermittently or at reduced capacity, as the accumulation of orders permit. Those of the Republic Iron & Steel Company at Moline, Ill., and East Chicago, Ind., are temporarily idle, but expect to have orders enough within a short time to resume. The 8 and 9 in. mills of the Illinois Steel Company at Milwaukee have started up. Specifications for both Steel and Iron Bars are coming in slowly, and the proportion of the new business received is small. Notwithstanding the inactivity of the market prices hold firm, there being no disposition among producers to offer inducements in hope of stimulating business. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.75c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Boiler Tubes.—Consumers are well supplied, stocks being generally adequate for the present reduced volume of business. The demand for boilers has slackened up and the output of the leading shops has been sharply curtailed. The local warehouses are getting a moderate amount of business, but orders are closely limited to current needs. Mill quotations for future delivery, on the base sizes, are as follows: 2⅜ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in	35	35	35
1¾ to 2¼ in	50	35	35
2½ in	52½	35	35
2¾ to 5 in	60	47½	47½
6 in. and larger	50	35	..

Merchant Pipe.—New projects involving the use of Pipe have to a large extent been held up by existing financial conditions, and in consequence the demand is limited to emergency orders, which develop but little tonnage. Stock orders are also light, since dealers are holding purchases down to the minimum required to maintain stock assortments. Part of the dullness may be properly attributed to the usual December slack up. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 72 per cent. on Black Steel Pipe, ¾ to 6 in.

About four points advance above these prices is asked for Iron Pipe.

Merchant Steel.—Postponement of shipments on contracts and fewness of new orders combine to make an exceedingly quiet movement in Smooth Finished Steel and miscellaneous shapes. The implement interests are moving slowly, but are perhaps contributing specifications with less reluctance than other consumers. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1⅛ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 54 per cent. off in car lots; 48 per cent., less than car lots, base territory delivery. e

Cast Iron Pipe.—Contracts aggregating 7500 tons were last week closed by the United States Cast Iron Pipe & Foundry Company. These comprised 5000 tons for the city of Chicago and 2500 tons for Phœnix, Ariz. All bids for construction work on the latter letting were rejected. Beyond the 3000 tons for Tucson, Ariz., letting for which has been postponed to January 6, no new business either present or prospective is reported. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., $34; 6 to 12 in., $33; 16-in. and up, $32, with $1 extra for Gas Pipe.

Old Material.—The market continues weak and unsettled, and is without firm support from any quarter. Buyers offer less for each succeeding purchase, and if a sale is made it is usually at a concession. About the only sales that command the top of the market are those made to short interests for prompt delivery on contracts. But for postponements that have been granted, practically all short tonnage would have already been taken care of. As it is, there is not a great deal of it outstanding, owing to stress of financial conditions, which have limited operations of this nature. The market will this week be called on to absorb 17,000 tons, a large part of which tonnage will naturally seek placement here. The offerings are distributed as follows: Wisconsin Central, 500 tons; Wabash, 1300 tons; Santa Fe, 3200 tons; Baltimore & Ohio, 12,000 tons. We quote per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails	$15.50 to $16.00
Old Steel Rails, rerolling	13.00 to 13.50
Old Steel Rails, less than 3 ft	13.00 to 13.50
Relaying Rails, standard sections, subject to inspection	24.50 to 25.00
Old Car Wheels	22.00 to 22.50
Heavy Melting Steel Scrap	11.50 to 12.00
Frogs, Switches and Guards, cut apart	11.75 to 12.25
Mixed Steel	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates	$14.00 to $14.50
Iron Car Axles	17.00 to 17 50
Steel Car Axles	17.00 to 17.50
No. 1 Railroad Wrought	11.00 to 11.50
No. 2 Railroad Wrought	10.00 to 10.50
Railway Springs	11.00 to 11.50
Locomotive Tires, smooth	16.50 to 17.00
No. 1 Dealers' Forge	9.50 to 10.00
Mixed Busheling	7.50 to 8.00
Iron Axle Turnings	7.50 to 8.00
Soft Steel Axle Turnings	7.50 to 8.00
Machine Shop Turnings	7.50 to 8.00
Cast Borings	5.50 to 6.00
Mixed Borings, &c	5.75 to 6.25
No. 1 Mill	7.50 to 8.00
No. 2 Mill	6.75 to 7.25
No. 1 Boilers, cut to Sheets and Rings	7.50 to 8.00
No. 1 Cast Scrap	13.00 to 13.50
Stove Plate and Light Cast Scrap	12.25 to 12.75
Railroad Malleable	10.50 to 11.00
Agricultural Malleable	10.00 to 10.50
Pipes and Flues	8.00 to 8.50

Metals.—To other restrictive causes the usual December slowing up has added emphasis to the quietness of trade. Inquiries are fewer, and the occasional orders placed were plainly of the hand-to-mouth sort. Prices have held pretty evenly, except Spelter, which has declined sharply. We quote as follows: Casting Copper, 14½c.; Lake, 15c. to 15½c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 33½c.; small lots, 34¾c.; Lead, Desilverized, 4.50c. to 4.55c., for 50-ton lots; Corroding, 5.65c. to 5.75c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5c.; Cookson's Antimony, 13c., and other grades, 11c. to 11½c.; Sheet Zinc is $7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13c.; Heavy Copper, 13c.; Copper Bottoms, 12c.; Copper Clips, 12c.; Red Brass, 13c.; Yellow Brass, 10½c.; Light Brass, 6½c.; Lead Pipe, 4¼c.; Zinc, 4c.; Pewter, No. 1, 21c.; Tin Foil, 26c.; Block Tin Pipe, 28c.

D. & G. Kaufman have opened an office in the Rookery Building, Chicago, as dealers in Iron and Steel, Steel Rails and railroad equipment. The members of the firm had been connected with the recently dissolved L. K. Hirsch Company for 15 years, and therefore have not only had a long experience in this branch of trade, but also enjoy a wide acquaintance.

Pittsburgh.

PARK BUILDING, December 11, 1907.—(*By Telegraph.*)

Pig Iron.—A largely attended meeting of the furnacemen making Foundry Iron, embracing the territory west of the Allegheny Mountains, including the Columbus, Hanging Rock, Mahoning, Shenango and Cleveland districts, was held in Cleveland, Ohio, on Saturday, December 7. The purpose was to talk over the situation and to devise means, if possible, of preventing ruinous competition in prices, to secure the very limited tonnage in Foundry Iron that is now being offered. Samuel Mather of Pickands, Mather & Co., Cleveland, was chairman of the meeting, and a committee of five was appointed to gather information and devise ways and means of preventing, if possible, complete demoralization in the Foundry Iron trade. It was suggested that the furnaces interests making Foundry Iron should adopt the same plan as that of the Steel and other interests, which is to blow out furnaces that do not have orders on which to run. Another meeting will likely be held in Cleveland in two weeks to hear reports and suggestions from the committee. The Pig Iron situation is almost stagnant as regards sales, only small lots for actual needs and prompt shipment being sold, and there are very few of these. The nominal price of Bessemer Iron is $19, Valley furnace, but if any Iron was wanted it is likely that $18 could be done. Northern No. 2 Foundry Iron is held at about $17.50, Valley furnace, or $18.40, Pittsburgh, and we note a sale of 200 tons for prompt shipment at that price. It is reported that Northern No. 2 Foundry has sold as low as $17, Valley furnace, or $17.90, Pittsburgh, but this report is not confirmed. The nominal price of Forge Iron is about $17.50, Valley furnace, or $18.40, Pittsburgh, but if any tonnage was wanted this price might be shaded. There are inquiries in the market for some Bessemer and Basic Iron for the first quarter of next year on which some relatively low prices have been quoted, but these inquiries are largely regarded as feelers and no tonnage has been closed.

Steel.—There have been no sales. We repeat nominal quotations of $28, Pittsburgh, for Bessemer and Open Hearth Billets, while Forging Billets are nominally $30, Pittsburgh.

(*By Mail.*)

The failure of the Fort Pitt National Bank and bankruptcy proceedings against the Whitney-Stephenson Company, leading stock broker in this city, in the past week, have had the effect of increasing the uneasiness which has existed in the local situation since the middle of October. While reports from New York and Chicago indicate that the financial situation in those cities is better, this does not seem to be the case here. Pig Iron and Steel are practically stagnant, and no material is being sold on which accurate prices could be based. Pig Iron output in the Pittsburgh District is down to less than 50 per cent. of the normal production, and the output of Bessemer and Open Hearth Steel is down to about 25 per cent. or less. The production here and in the Valley districts will be further materially reduced before the first of the year, as a number of plants are getting ready to close when the few orders on hand are cleaned up. The Bessemer Steel plant of the Republic Iron & Steel Company at Youngstown, which was down last week, is running again this week, but the other Bessemer Steel plant there is still idle. The feeling is growing that the only way to meet the present serious condition in the Steel trade is not to make material that the market does not want, but to cut off output. There are some few inquiries for Bessemer and Basic Pig Iron for delivery in the first quarter of next year, but so far no tonnage of importance has been closed. Some of the furnaces that are now running will be shut down soon, and their owners are opposed to quoting on Pig Iron for delivery for next year until the situation is clearer. A few orders for Finished Iron and Steel are coming in, but for small lots and actual needs. An enormous amount of tonnage has been hung up, but the opinion is general that this business is only "backing up," and when confidence is again restored there will be a rush for supplies and buyers will have trouble in getting deliveries. It should not be forgotten that consumption, while materially reduced, is still going on.

Ferromanganese.—In the absence of actual sales, we quote foreign 80 per cent. Ferro nominally at $50, seaboard, or $51.90, Pittsburgh. On a firm offer this price might be shaded.

Muck Bar.—Most of the mills using Muck Bar in the rolling of Iron Bars are either shut down entirely or running on very short time, and there is no new demand. We quote Muck Bar of the best grades, made from all Pig Iron, nominally at $32, Pittsburgh. There have been no recent sales on which to base actual prices.

Steel Rails.—The Carnegie Steel Company has issued new Rail specifications for 1908 delivery. No important business has been placed, but it is said that two important

railroads are figuring on their 1908 tonnage and the contracts may soon be placed. The Edgar Thomson mill of the Carnegie Steel Company is still in operation to less than half its capacity, making about 1200 tons a day or less. The demand for Light Rails is rather quiet. Prices on Light Rails, which are cut about $2 a ton or more by the mills rerolling Rails, are as follows: 25 to 45 lb., $30; 20-lb., $31; 16-lb., $32; 12-lb., $34; 10-lb., $36, and 8-lb., $40. We quote Standard Sections at $28, at mill, and Angle Splice Bars at 1.65c., at mill.

Plates.—New business is confined to small lots for prompt shipment and actual needs. The leading mills are still fairly busy on old contracts, but are cleaning these up at a pretty rapid rate. They will enter 1908 with much less work on their books than for a long time, and some will probably have to close early in the new year, unless they get some tonnage in the meantime. Prices are fairly well maintained, but in certain sections are being shaded by a few mills to the extent of not more than $2 a ton. We quote: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell grade of steel is abandoned.

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—The contract for the Structural work for the Memorial Building, to be erected in this city, has been placed with the Brown-Ketcham Iron Works of Indianapolis, while the Steel, about 1900 tons, is to be rolled by the Jones & Laughlin Steel Company. Several of the leading Structural concerns report inquiries slightly better, and expect that after the first of the year considerable work will be placed. Some low prices are being made on bids going in for fabrication. Some of the Structural mills are short of work. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—It is estimated that the output is down to about 40 per cent. or less of actual capacity, and the mills in operation are running largely against contracts, very little new business being placed, and only in small lots for actual needs. Prices on Roofing Sheets and Black Sheets are being shaded by some of the mills, and also by some jobbers, to the extent of about $2 a ton, but the market as a whole is fairly strong. Regular prices are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 2 gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Tin Plate.—There has been no perceptible improvement in the new demand for Tin Plate, and none of the mills is operating to full capacity. Some plants are entirely closed, while others are operating just enough of their equipment to take care of specifications against contracts and the few new orders that are being placed. We quote $3.90 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days.

Iron and Steel Bars.—The amount of new business being placed in both Iron and Steel Bars is relatively light, while specifications against contracts are not coming in at a satisfactory rate. The leading makers of Iron and Steel Bars are endeavoring to restrict the output to meet actual demands and prevent any large accumulations of stocks. Prices are fairly strong and there is no disposition on the part of the mills to attempt to force business under present unfavorable conditions by cutting prices. We quote Steel Bars at 1.60c., base, Pittsburgh, and Iron Bars at 1.60c., Pittsburgh, either for delivery in the Pittsburgh District or for Western shipment.

Spelter.—There has been another violent break in prices, and prime grades of Western Spelter are now offered as low as 4.35c., St. Louis, equal to 4.47½c., Pittsburgh. Very little new business is being placed, although prices of Spelter are lower than for some years.

Hoops and Bands.—New business is only for small lots for actual needs, while specifications against contracts are only fair, a good deal of tonnage having been hung up. It is stated that regular prices are being maintained. We quote Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Spikes.—Some buying of Railroad Spikes is anticipated early in the year, but at present the demand is stagnant. There is a fair tonnage being placed in the smaller sizes, and prices are fairly firm. We quote Railroad Spikes at $1.90 to $1.95, and the smaller sizes at $2.05 to $2.10 per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—Only small lots for actual needs are being bought. Shipments have been held up on a large number of contracts, and some of the mills are decidedly short of work. Prices are largely nominal, as follows: Cold Rolled Shafting at 54 per cent. off in large lots and 48 per cent. off in carload lots, delivered in base territory; Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades, and 10c. and upward for special grades.

Merchant Pipe.—Conditions in the Pipe trade are about the same as for some weeks past. New business is only for current needs and in small lots. The leading mills are pretty well caught up on back orders, while the output has been very materially restricted to prevent the accumulation of stocks. Prices on Steel Pipe are firm, but on Iron Pipe are considerably shaded. The net discount on Steel Pipe to the large trade on ¾ to 6 in. is 74 and 5 per cent. off list, while on Iron Pipe ¾ to 2 in., 71 and 5 per cent., and over 2 to 6 in., 70 and 5 per cent. are quoted. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads. Steel. Black. %	Galv. %
⅛ to ¼ in.	65	49
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

To the large trade all above discounts are subject to 1 point on the base, and 5 per cent. on the net.

Boiler Tubes.—There is a fair amount of tonnage in small lots being placed in Merchant Tubes, but the demand for Railroad Tubes is stagnant, and prices on the latter are being materially shaded. Discounts on Merchant Tubes are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	42	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Coke.—Some inquiry is in the market for Furnace Coke for delivery over the first half of next year, on which from $2.35 to $2.50 a ton at oven has been quoted. Some grades of Furnace Coke for spot shipment are offered as low as $2 and Foundry at $2.50 to $2.75 per ton at oven. These prices are lower than would be named on contracts. Coke production in the Connellsville and other regions is down to about 40 per cent. of the normal output, the Upper and Lower Connellsville regions having made last week less than 200,000 tons. It is intimated that a general reduction in the wages of Coke workers, which are higher now than for some years, will be made about January 1. This, however, has not been officially confirmed.

Iron and Steel Scrap.—Considerable tonnage has been sold by the Pennsylvania and the Baltimore & Ohio railroads to dealers, and at the lowest prices that have prevailed for three or four years. There is practically no new demand for Scrap from consumers, many of whose plants are either closed down entirely or running about half time. Nominal quotations by dealers are about as follows: Heavy Steel Scrap, for Pittsburgh, Sharon or Steubenville delivery, $13.50 to $14; No. 1 Railroad Wrought Scrap, $14; No. 2,

$13.50; No. 1 Cast Scrap, $15 to $15.50; Bundled Sheet Scrap, $11.50 to $12; Cast Iron Borings, $7 to $7.50; Rerolling Rails, $14 to $14.25; Low Phosphorus Melting Stock, $17.50 to $18; Old Steel Rails, short pieces for open hearth use, $13.50 to $14; No. 1 Busheling Scrap, $13; No. 2, $10; Steel Axles, $19 to $19.50; Iron Axles, $23 to $23.50; Standard Sheet Bar Crop Ends, $16.50 to $17; Stove Plate, $11.50 to $12 net ton; Grate Bars, $13. All above prices are per gross ton, f.o.b. Pittsburgh, unless otherwise stated, and are purely nominal in the absence of actual sales on which to base quotations.

Philadelphia.

PHILADELPHIA, PA., December 10, 1907.

The market for Iron and Steel continues dull. Buyers in every branch of the trade hold off purchasing any materials, other than are absolutely needed to take care of immediate needs, or to piece out shortages here and there, and it looks as if the business done in the Iron and Steel trades during the month of December would be small. The large buyers are fully covered and the smaller ones buy in such limited quantities that the aggregate tonnage for this class of business is not very heavy. Consumers will no doubt continue to use up stocks on hand, rather than order forward further shipments from producers, until after the turn of the year. In some melters' yards the scattered material on hand is being worked up, even though the cost of handling is high, and the policy of cleaning up the odds and ends will probably continue unless prevented by weather conditions, under which circumstances mills would no doubt order materials forward. Curtailment of production, however, has reduced the present needs fully one-half, so that unless there is an early resumption of business many of the mills will not require a very large tonnage to pull them through the winter months. Financially, the situation looks better; currency is more plentiful, and the general opinion is that conditions will continue to improve, but until the confidence expressed is substantiated by actual business, we can hardly expect any great change in the situation.

Pig Iron.—There has been no particular movement in any grade during the past week. It is usual on the part of buyers to restrict purchases at this season, if possible, until after the close of the year, and under the present circumstances the trade looks for a further decrease in sales during the next few weeks. Buying recently has been in small tonnages only, sales ranging from carloads up to lots of 100 tons, with an occasional sale of a few hundred tons. Consumers, however, are not placing orders for forward delivery, the inclination being to go along slowly, making their purchases at about current prices, and they seem willing to let the future take care of itself, it being impossible at the time to estimate their requirements for next year. Melters are probably running at about half their capacities and stocks in buyers' yards are generally very low. Curtailment policies continue. The production of Pig Iron shows a further decline and producers have the situation well in hand. Additional furnaces are going out of blast from week to week, and will probably continue to do so when they have caught up with the high priced orders on hand. There is little accumulation of stocks on the furnace banks, and producers say they will not pile any large tonnage, so that if the present rate of curtailment continues it is likely that it will not take a great while to bring production down somewhere in the neighborhood of present consumption. There has been a little more inquiry for Foundry Irons. Buyers appear to be feeling the market, but the tonnages asked for continue small and cover comparatively early delivery. While there is a somewhat better feeling prevalent as to the future, no buying of any moment is anticipated until after the first of the year, and then it will depend on conditions existing at that time as to whether a buying movement sets in or whether a further period of inactivity will prevail. The Foundry grades showed the most activity during the week. Sales, however, have been scattered and the price of No. 2 X Foundry has dropped off another 25c. a ton, and Iron of this grade can be had without much trouble at $18.50 delivered for reasonably prompt shipment. A little demand for Iron for Pipe making was shown recently, but the tonnage was very small. Forge Iron has been dull, and there is practically no demand. A small tonnage was sold at figures close to $17, but some grades can easily be had at lower figures. Since the recently reported sale of Basic Iron, the demand for this grade has been very quiet. Consumers are pretty well covered for the next 30 or 60 days at least and have in most cases accumulated Iron during the past few months, so that their requirements are not very urgent. While no sales have been made, it is believed that it would be possible to shade the nominal quotation of $17.50 delivered should a good buyer for Basic Iron come into the market. Low Phosphorus Iron is inactive, no buyers being in the market at the present time. Quotations do not show much change, due principally to the absence of business. The range for deliveries in buyers' yards, December and January, eastern Pennsylvania and adjoining territory, is about as follows:

No. 2 X Foundry	$18.50 to $18.75
Gray Forge	16.50 to 17.00
Basic	17.50
Low Phosphorus	25.00 to 25.50

Ferromanganese.—There is practically no business around. Consumers are pretty well taken care of, and deliveries are being held up in a number of instances. In the absence of business Ferro is nominally quoted at $49, Baltimore, for December delivery, but it is hard to say what price would be named for a round lot for next year's delivery.

Steel.—Mills in this territory continue to curtail production. The demand is extremely light, and the tonnage of new business is very small. Buyers will not place orders for forward delivery, and take only enough for their immediate needs. Prices are nominally unchanged, $30 to $31 being quoted for Ordinary Steel, with Forging Steel at $33 to $35. A readjustment of prices would, however, be necessary should any tonnage come out, as a good buyer could no doubt get a concession.

Plates.—A little better inquiry has developed for Plates. A few fair orders have been placed recently for prompt shipment, as some buyers are said to be finding themselves pretty bare of stocks. Bridge Plates have been a shade more active, and some new business has been done in locomotive Plates. A little better feeling in the situation is expressed by the trade, although mills continue to operate at about half their capacities. Prices continue to be maintained, and are quoted as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Commercial Firebox	2.05	2.10
Marine	2.25	2.30
Locomotive Firebox Steel	2.35	2.40

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—There has been no change in the situation regarding Structural Material. A miscellaneous business continues to come out, although the prospects for future business are considered somewhat better. The city of Philadelphia will spend a large sum during the coming year for a number of smaller bridges, and one or more larger propositions are before the trade. There has been a little curtailment of production at some of the mills, but as a rule those in this territory keep fairly well occupied. Prices are unchanged and range from 1.85c. to 2c., according to specifications.

Bars.—Bars continue inactive and mills are being operated almost without exception on reduced tonnages. Some few inquiries have been before the trade, but buyers want lower prices, which sellers as a rule decline to meet, the ruling quotations of 1.75c. to 1.80c. being maintained for Best Refined Iron, with Steel Bars quoted at about the same figure.

Sheets.—Mills are hardly able to keep running at half capacity on the new business coming out. The demand is very light, and such orders are as being received are for prompt delivery only. Prices are not strong, but continue to be quoted as follows for mill shipments, with a tenth extra for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—There has been practically no business the past week. Mills in many cases are not taking deliveries on old contracts, and transactions are almost entirely between dealers, under which circumstances prices vary according to how badly the dealer needs the material to fill a contract. One lot of 1000 tons of No. 1 Steel Scrap was offered a consumer at $12, delivered, but did not prove attractive. Prices can be only approximately named, and are nominally quoted as follows, for prompt delivery, in buyers' yards:

No. 1 Steel Scrap and Crops	$11.50 to $12 00
Low Phosphorus	16.00 to 16.50
Old Steel Axles	18.50 to 19.00
Old Iron Axles	23.00 to 24.00
Old Iron Rails	17.50 to 18.00
Old Car Wheels	19.00 to 20.00
Choice No. 1 R. R. Wrought	14.50 to 15.00
Machinery Cast	15.50 to 16.00
Wrought Iron Pipe	12.50 to 13.00
No. 1 Forge Fire Scrap	11.50 to 12.00
No. 2 Light Iron	8.00 to 8.50
Wrought Turnings	9.00 to 9.50
Stove Plate	12.50 to 13.00
Cast Borings	7.00 to 7.50
Grate Bars	13.00 to 13.50

Cleveland.

CLEVELAND, OHIO, December 10, 1907.

No interest is as yet being shown in next year's Ore market, and some of the leading shippers do not look for a buying movement before March, and it may be until that month before the season's prices are fixed. There is a strong sentiment among some of the prominent mine operators against lowering this year's prices. There is a possibility that a slight reduction will be made in the price of Non-Bessemer Ores, but it is doubtful if any change will be made in the Bessemer price, some shippers saying that in view of the increasing scarcity of Bessemer Ore they would rather leave the Ore in the ground than sell it at lower prices. Present prices are as follows at Lake Erie docks, per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range Non-Bessemer, $4.25; Mesaba Non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous Non-Bessemer, $2.35 to $2.60.

Pig Iron.—There is no improvement in the demand for spot Foundry Iron, and prices are considerably weaker. Foundries are running at about one-half their capacity, and the prespects that they will increase their melt in the near future are not very promising. More merchant furnaces have gone out of blast during the week and others will probably shut down before the first of the year. The general policy being followed by the furnacemen is to shut down as soon as their orders are filled, and not to accumulate any stock piles. The Struthers Furnace, which produces Basic Iron, will go out of blast this week. The River Furnace of the Upson Nut Company, Cleveland, will be banked this week for repairs, but it is expected that it will start up again in about two weeks. The ruling price seems to be about $18, Valley furnace, for No. 2 Foundry, although some furnaces are asking $18.50. One local interest reports better inquiries for spot Iron at its Eastern furnaces from Eastern consumers, and made several sales during the week, including one 500-ton lot at a price a little under $18, at furnace for No. 2 Foundry. This interest is asking from $17.50 to $18 at furnace for No. 2. There have been several local inquiries for Foundry Iron for the first half of next year, and some consumers show an inclination to buy if they can secure satisfactory prices. Previous inquiries have been more for the purpose of testing the market rather than with the idea of placing orders. None of the foundries and furnaces, however, have as yet got together on prices for the first quarter or first half. Some of the foundries have suggested a price of $17, at furnace, for No. 2, and others have wanted the same price delivered. Quotations for the balance of the year, f.o.b. Cleveland, are as follows:

Bessemer	$19.90
Northern Foundry, No. 1	$18.50 to 19.00
Northern Foundry, No. 2	18.00 to 18.50
Northern Foundry, No. 3	17.50 to 18.00
Southern Foundry, No. 2	18.85 to 19.35
Gray Forge	18.90

Coke.—There is no demand. Prices are weak, and more ovens have been shutdown. There is a tendency among operators to continue to curtail production to prevent a further reduction in prices. Because of the blowing out of the furnace of the Struthers Furnace Company the 200 ovens of the Struthers Coal & Coke Company, at Fairbank, Pa., were shutdown early this week. We quote Connellsville Furnace Coke at $2.25 to $2.50, at oven, and 72-hr. Connellsville Foundry Coke at $2.75 to $3.25, at oven. These prices, however, are largely nominal.

Finished Iron and Steel.—While the majority of the mills report no change in the situation, a few report better inquiries and a slightly better demand for small orders. These orders, however, are mostly to complete work already started. The current business is mostly for car lots and less, and the specifications that are coming in are for small tonnages. A leading interest reports that since the financial disturbance began shipments have been ordered withheld on about 75 per cent. of its orders on contracts. On many of these contracts specifications had been received for shipments up till next July. The financial situation is gradually improving, and while it is much easier to obtain money from the banks than two or three weeks ago, the situation is as yet far from normal, and large industries that need a great deal of money in the operation of their plants still have trouble in securing the necessary currency. While the general feeling regarding future conditions is growing better, the mills are not looking for much improvement in the demand for Finished Material before the first of the year or perhaps the middle of January. Prompt deliveries can now be secured on practically all lines. Prices remain firm, except on Bar Iron, Light Plates and Sheets. Some mills are making concessions of $2 a ton on Black Sheets and $1 per ton on Galvanized Sheets. New orders in Iron Bars are very limited, but one of the two local mills that had been shutdown for lack of orders was able to start up again this week. The only good sized inquiries received in the local market during the week were for Plates, one inquiry being for 500 tons and the other for 5000 tons. The latter inquiry came from a bridge building concern that intends to make a bid on the approaches for the new Manhattan Bridge in New York. We quote Iron Bars at 1.60c., Cleveland, for local or outside delivery. This price, it is reported, is being shaded by Western mills. We quote Steel Bars at 1.70c., Cleveland, for carload lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼-in. and heavier, 1.80c., base, Cleveland. Regular prices on mill shipments of Sheets, carload lots, Cleveland, are as follows: Blue Annealed, No. 10, 1.95c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. Warehouse business continues light, with prices unchanged. We quote Steel Bars out of stock at 1.90c. to 1.95c., and Iron Bars at 1.95c. to 2c. Beams and Channels out of stock are 2.10c. to 2.15c., base. Stock prices on Sheets are as follows: Blue Annealed, No. 10, 2.20c.; Box Annealed, No. 28, 2.90c.; Galvanized, No. 28, 4.05c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—No improvement is noted in the demand and the situation is practically unchanged, although prices, which are mainly nominal, show a tendency to further weakness, being affected by the large railroad offerings of the past week. A few of the mills are taking a small amount of Scrap on contracts and some sales in small lots for immediate needs are reported. The best demand seems to be for Busheling and Turnings. Mills that are in the market for any kind of Scrap, however, are offering very low prices and usually succeed in picking up what they want at prices a little lower than the nominal quotations. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$13.50 to $14.00
Old Iron Rails	17.00 to 18.00
Steel Car Axles	18.00 to 19.00
Old Car Wheels	18.00 to 19.00
Relaying Rails, 50 lb. and over	27.50 to 28.00
Relaying Rails, under 50 lb.	30.00 to 31.00
Heavy Melting Steel	12.50 to 13.00
Railroad Malleable	13.00 to 14.00
Agricultural Malleable	12.00 to 12.50
Light Bundled Sheet Scrap	10.00 to 11.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$18.00 to $19.00
Cast Borings	6.00 to 6.50
Iron and Steel Turnings and Drillings	7.50 to 8.00
Steel Axle Turnings	10.50 to 11.00
No. 1 Busheling	11.00 to 11.50
No. 1 Railroad Wrought	12.00 to 13.00
No. 1 Cast	13.00 to 14.00
Stove Plate	11.50 to 12.00
Bundled Tin Scrap	10.00

Birmingham.

BIRMINGHAM, ALA., December 7, 1907.

Pig Iron.—Notwithstanding the fact that inquiries made during the week have resulted in no contracts to cover future requirements, the sales of spot Iron, together with the interest manifested as to deliveries for the first quarter of 1908, indicate that confidence is gradually being restored and the prospects for an early buying movement are more favorable. Prices have suffered a further decline, and it is to be noted that, with the probable exception of one of the leading interests, concessions have been made by all producers. A feeling of uncertainty as to market conditions is still prevalent, and sales have been made accordingly. While sales of No. 2 Foundry have been made at $15, f.o.b. furnace, the former differential of $1 per ton for lower grades has been reduced, and a difference of 50c. per ton on a $15 basis is thought to be the best that has been done this week. The tonnage sold for immediate delivery on this basis is quite attractive, and as it is believed that the reduction will facilitate successful operation of many foundries now idle, it seems highly probable that the demand for spot Iron will immediately increase. This being true, and in view of the fact that the output of furnaces is now limited to tonnage applying directly against contracts and that no stocks are on furnace yards, it seems that the general belief that bottom prices have been reached is warranted. However, the volume of new business now in evidence with melters is so small that no doubt requirements will not be urgent, and the probabilities are that the restoration of normal conditions is some distance in the future. No further curtailment of production of merchant Iron is reported and 11 furnaces continue to be operated. The Gadsden Furnace of the Southern Steel Company, however, has been blown out, and the production of Basic Iron is now limited to five stacks.

Cast Iron Pipe.—It is learned that a contract covering 2500 tons of Water Pipe for the city of Phoenix, Ariz., has been awarded one of the Southern plants and that former quotations were maintained. It is also learned that the annual contract for the city of Baltimore, Md., will be awarded December 18, and that tonnage for a few other cities will be placed at an early date. The aggregate tonnage recently placed seems to be quite satisfactory, in view of the general conditions throughout the country, and producers are much encouraged, although some stocks have accumulated and curtailment of production has been necessary

in some cases. Prices are unchanged and quotations on Water Pipe are approximately as follows, per net ton, f.o.b. cars here: 4 to 6 in., $30; 8 to 12 in., $29; over 12 in. average, $26, with $1 per ton extra for Gas Pipe. These prices are probably shaded on large municipal contracts.

Old Material.—There is no evidence whatever of an improvement in market conditions. Dealers report a very small tonnage as being sold, and inquiries received are not encouraging. Stocks have accumulated, and quite an accumulation is to be found in yards of dealers. The transactions reported do not warrant a definite statement as to prices, but former quotations are being made, and we quote the following, per gross ton, f.o.b. cars here:

Old Iron Rails	$22.00 to $22.50
Old Iron Axles	18.50 to 19.00
Old Steel Axles	17.00 to 17.50
Old Car Wheels	20.50 to 21.00
No. 1 Railroad Wrought	17.50 to 18.00
No. 2 Railroad Wrought	13.00 to 13.50
No. 1 Country Wrought	14.50 to 15.00
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	13.50 to 14.00
Railroad Malleable	14.00 to 14.50
No. 1 Steel	13.50 to 14.00
No. 1 Machinery Cast	14.25 to 14.75
Stove Plate and Light Cast	10.25 to 10.75
Cast Borings	7.75 to 8.25

Cincinnati.

CINCINNATI, OHIO, December 11, 1907.—(*By Telegraph.*)

Although both foundrymen and machinery manufacturers are finding little to occupy their time in their respective avocations, industrially speaking, there is plenty of interest going on in each division. Foundrymen are occupied with the compilation of new contracts for the ensuing year, and machinery manufacturers are figuring out costs of promotion, devising ways and means for making up deficits in sales returns, and handling the vast correspondence that accumulates in times of sudden depression. Members of the local foundrymen's association, with invited guests, met on Monday to read over the proposed form of contract submitted by the machine tool men, and adjourned after a lengthy discussion to meet on Wednesday at the Grand Hotel, when a form of contract devised by the foundrymen themselves and formally adopted at the Monday meeting as best representing their interests, in common with the machine tool men, will be taken up and, with such alterations as may be found necessary in the interim, submitted to the tool manufacturers for their approval. It is evident from the expressions of prominent men on both sides of the question that mutual concessions will have to be made if anything like a uniform contract is to be adopted. In not a few instances there are existing contracts, covering periods ranging from one to two years, and these are said to be, in the main, satisfactory to both parties. It is hardly possible that anything like a uniform contract, which will be signed by the representative makers and users of castings alike, will be devised for this field. In the meantime the discussions are bound to be productive of good and often lead to new business all around. In Pig Iron there is the same waiting game, with still little to base speculations upon for the new year which is so close. There is absolutely nothing doing in the Scrap line, and sales of Finished Material are still of the hand to mouth variety, with no special activity in any line. An encouraging feature to machine tool manufacturers is the fact that, with all the curtailment and slumping off of order books, price cutting is not a factor of the situation. There is a little better inquiry all along, and collections are, in the main, good.

Pig Iron.—Agents are frankly admitting that they are unable to say what can be done for either the spot or the 1908 market, and any kind of a firm order is apt to be negotiated with the furnace before a price can be made unless the buyer is willing to pay the asked price, which is on the basis of $15, Birmingham, on No. 2 Southern, and $18 at furnace for Northern. That these prices are being shaded, however, is conceded by all well posted interests, and in the case of the Southern product it is generally admitted that $14 and lower has been done. A specific case is cited in the filling of a Battle Creek, Mich., order, which is said to have gone at the ridiculously low price of $13.65, at furnace, for a 500-ton lot, first four months' delivery. An error in transmission last week made this requirement read 15,000 to 25,000 tons, instead of, as written, 1500 to 2500 tons. The inquiry of the Dayton concern for Malleable is thought to have been temporarily dropped because of the inquirer's lack of business to justify. This inquiry was written 1000 instead of 10,000 tons, as it appeared in the report. An inquiry has come out to-day for a 3000-ton lot of No. 4 Foundry for first quarter delivery from an Eastern melter. There is a fair demand for High Silicon Irons, which are quotable on a basis of $26, at furnace, for 8 per cent. Reports from the Ironton District show but four furnaces in blast, namely, the Norton, which is making Malleable and Bessemer; the Ashland High Silicon, and Nellie and Hamilton Foundry Iron. The three furnaces in the Wellston District are still in blast, but it is reported that one will be banked soon. There is little change reported in the South, though it is highly probable that more furnaces will be put out in the next two weeks. The Dayton Coal & Iron Company has but one of its two furnaces at Dayton, Tenn., in blast. The reported agreement at Cleveland is having the effect of steady prices on Northern Iron, which is held pretty firmly on an $18 basis. At one of the larger agencies here several long distance telephone inquiries for spot Iron within the past day or so have suggested that the melt is improving, and that contracts are expiring. As nearly as the market can be gauged in its present chaotic condition, prices for immediate delivery and remainder of the year are quotable as follows, the freight rates from Birmingham being $3.25 and from the Hanging Rock District $1.20:

Southern Coke, No. 1	$18.00 to $18.50
Southern Coke, No. 2	17.50 to 18.00
Southern Coke, No. 3	17.00 to 17.50
Southern Coke, No. 4	16.50 to 17.00
Southern Coke, No. 1 Soft	18.00 to 18.50
Soutaern Coke, No. 2 Soft	17.50 to 18.00
Southern Coke, Gray Forge	15.75 to 16.25
Southern Coke, Mottled	15.50 to 16.00
Ohio Silvery, 8 per cent. Silicon	27.20 to 27.70
Lake Superior Coke, No. 1	19.70 to 20.20
Lake Superior Coke, No. 2	19.20 to 19.70
Lake Superior Coke, No. 3	18.70 to 19.20
Car Wheel Irons.	
Standard Southern Wheels	$28.25 to $29.25
Lake Superior Car Wheels	27.70 to 28.00

Coke.—There is a little increased inquiry. Production is slackening, keeping pace with Pig Iron curtailment. Foundry grades are a trifle easier, ranging from $2.75 to $3 at oven for Connellsville, while no one seems to want Furnace Coke, which could be bought around $2.

Finished Iron and Steel.—Dealers are resting on their oars and confidently hoping for better things early in the new year, with the return of banks to normal conditions. For the present there is little moving, only such as is needed for absolute requirements, and in small lots. Prices are being well maintained. Dealers quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 1.85c., base, full extras; Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, full extras; Base Angles, carload lots, 1.75c.; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, ¼-in. and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; Sheets, No. 16, carload lots, 2.20c.; small lots from store, 2.50c.; No. 14, carload lots, 2.10c.; small lots from store, 2.40c.; Steel Tire, 4-in. or heavier, carload lots, 1.95c., base; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.; Sheets, No. 10, 2c., carload lots; 2.30c. from store; Sheets, No. 12, 2.05c., carload lots; 2.35c. from store; Light Sheets, Black, No. 28, carload lots, 2.75c.; Galvanized, No. 28, 3.90c.

Old Material.—Like the dealer in Finished Material, the Scrap dealer is looking to the new year, the loosening up of the banks and starting of the idle works to give his overstocks of Scrap a movement. There is absolutely no inquiry now, and save a little purchase here and there, for some special requirement, the market is dead. The Scrap dealers are watching the Pig Iron market closely, looking for relief when prices begin on the ascending scale. With this lack of buying, the following prices are given as the best obtainable and are f.o.b. Cincinnati:

No. 1 Railroad Wrought, net ton	$10.50 to $11.00
Cast Borings, net ton	5.00 to 6.00
Steel Turnings, net ton	6.00 to 7.00
No. 1 Cast Scrap, net ton	13.00 to 13.50
Burnt Cast and Wrought, net ton	9.00 to 9.50
Old Iron Axles, net ton	17.00 to 18.00
Old Iron Rails, gross ton	15.00 to 16.00
Old Steel Rails, long, gross ton	11.50 to 12.00
Relaying Rails, 56 lb. and up, gross ton	21.00 to 22.00
Old Car Wheels, gross ton	18.00 to 19.00
Mining Car Wheels, gross ton	10.50 to 11.50
Low Phosphorus Scrap, gross ton	14.00 to 14.50

The Jamison Coal & Coke Company, Frick Building Annex, Pittsburgh, Pa., has recently completed a new steel tipple at its No. 1 plant at Luxor, Westmoreland County, Pa., while the construction of its new coal washer, being erected at the same plant, is nearing completion, and will be in service about February 1. The 350 coke ovens, which are idle on account of the burning of the other coal washer, will then be placed in operation. The company states that its other coke plants are in full operation.

The City of Greater Pittsburgh became an accomplished fact on the morning of December 6, when the decision of the Supreme Court arrived in Pittsburgh and was officially placed on file. The union of Pittsburgh, Allegheny and a number of suburbs makes the new city of Greater Pittsburgh the sixth city of the country in point of population.

The Coal Trade.

BY FREDERICK E. SAWARD.

With the advent of December came a reduction in the price of soft coal, following the perceptible falling off in the tonnage ordered. There will now be a curtailment of production at the collieries to an even greater extent than has yet been the case. This, with the interruption to traffic by winter weather, may put some of the industrial plants in trouble, so far as coal supplies are concerned, for it is a notable fact that the past six months have seen a most decided effort to curtail expense bills by using closely supplies on hand. The general opinion is that a change for the better will be seen in general business after the middle of January, with the completion of stock-taking, and the effort to make out as good a balance as possible for the closing year. If this be so, there will be a larger demand on the collieries for coal, and if the winter is severe prices may hold as they are; otherwise not.

Some fear is expressed that the demands of the men for an advance over the present scale of wages may lead to a stoppage of mining. This will eventuate after the meeting of the United Mine Workers, in January. For the present, at least, it can be said that there is a full supply of steam soft coal, and at prices which are 10 per cent. less than was the case in early October, when everything looked like a full year of tonnage, with a $2 per ton price at the mines for all the better grades of coal. Even the ordinary slack has dropped off in price, until now the rate of 70 cents a ton at the mines is considered a pretty good figure.

The coal trade of the country—meaning the operators and sellers—can well take heart of grace and put down 1907 as a good year. Nine months of it were first class, two months were medium and one was slow—dead slow. We hardly ever have three solid years of "fat" in the 10-year periods, and sometimes the seven are very "lean." It begins to look now as if we have had the banner year of output of coal of all kinds, and the mine worker has made out well. We fancy that next year he will not fare quite so well, for good and sufficient reasons.

The soft coal trade for the past week has been very quiet, on account of the large quantities at all of the tidewater points, due to the fact that so many embargoes have been placed lately on Pennsylvania Railroad all-rail shipments to points on the New York Central Railroad and in New England that the mines have all had to ship their output to tidewater. This happened at a time when there was little or no demand, and prices naturally dropped off, on account of the accumulation.

At New York boats have been more than plentiful, and in some cases were offered for less than the regular harbor freights, in order to secure line business, which at this time is netting much more than tidewater business. The car supply all over the coal regions has been very good for the past week, the mines receiving more than the regular allotment. The main feature of the mines not working steadily is the general scarcity of miners.

What little buying is going on is by people who are absolutely in need of coal. Others are holding off, on account of the financial situation. Most of the operators find it difficult to make collections, and a number of the sales being made are for cash, and the seller, in most cases, is willing to make a reduction in order to get cash.

Pea coal seems to be about the only one of the small sizes of Anthracite which is short at this time, there being little or none to be had. This size has been more or less short all the season, and has been bringing the best prices. Buckwheat has been more than plentiful lately, with the exception of last week, when there was more demand for it than some time ago. Rice has had little or no demand, and this size is bringing prices now which usually prevail in the summer months. Barley coal seems to remain about the same, and, in fact, has remained about the same all summer. As in soft coal, the Anthracite line trade is much better than tidewater business. The mines all over the Anthracite District are working full, and the car supply is as good as it usually is. Anthracite steam sizes seem to be the most desired just at present. It is one of the signs of advance and progress that this is so.

Since the adjournment of the joint conference held at Indianapolis on September 29, to reassemble the 19th of this month, there has been a singular reticence among producers as to what they think will be the result of the second meeting. It is said that a joint conference will probably be agreed upon, but that is no assurance that a wage contract will come out of it.

Bituminous coal throughout the country has been produced at a tremendous pace this year. We have not had so many new mining companies formed, but those that had their plants opened and in operation have done well, and many new records can be noted. Those which were large are larger, and this keeps pace with the country's development.

New York.

NEW YORK, December 11, 1907.

Pig Iron.—There have been some larger transactions, two of them involving 5000 tons each, and one 2000 tons. There has also been some business in low-phosphorus Iron. Southern Iron has been offered at lower prices. We quote Northern Iron, tidewater, $19 to $19.50 for No. 1 Foundry, $18 to $18.50 for No. 2 Foundry, and $17.25 to $17.50 for No. 2 Plain. Alabama Irons are quoted nominally $19.25 to $19.50 for No. 1 Foundry, and $18.25 to $18.50 for No. 2 Foundry.

Steel Rails.—Announcement will probably be made in the coming week of one or two contracts for 1908 that have been under negotiation recently. The Pennsylvania Railroad order for 15,000 tons, of which mention has been made in the dispatches this week, simply represents the specifications on the remainder of the tonnage reserved by this system for 1907.

Structural Material.—The bids for the approach to the Manhattan Bridge were opened on Monday. The lowest was that of John C. Rodgers, $2,167,304. Three other bids were made, that of the Maryland Steel Company, $2,179,724, being very close to that of the successful firm. It is expected that the Steel for this contract, about 15,000 tons, will be fabricated by the American Bridge Company. Around New York most of the Steel work under construction is being brought rapidly to completion, and the prospect is for a period of quiet for Structural workers. In January some stir may appear in architects' offices, and such assurances are given, but general conditions will determine. Some Pacific Coast business is pending, bids having been submitted on 2500 tons for the Ranier-Grand Hotel at Seattle and for 1200 tons for the Y. M. C. A. Building at Portland. San Francisco and Los Angeles Structural markets are dead. We continue the following quotations on mill shipments, tidewater delivery: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Material cut to length is sold from stock at 2¼c. to 2½c.

Bars.—The condition of the Bar Iron business is such that the Eastern mills are idle a considerable part of the time, waiting until, by bunching the small orders now being received, they are able to run for a few days. A slight increase is now perceptible in the volume of business thus accumulating, and manufacturers are feeling somewhat more hopeful of further improvement. The usual quotation on either Iron or Steel Bars is 1.60c., Pittsburgh, or 1.76c., tidewater. Some of the smaller mills, which do not make a full range of sizes, are selling Bar Iron at some concession.

Plates.—Consumers are doing very little, and therefore the demand for Plates is exceedingly light. Prices continue as follows for tidewater delivery: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—Some business is now in sight, and in this respect conditions are rather better than they have been for a considerable time. Gas companies are inquiring prices on about 3500 tons. The city of Baltimore is in the market for 3800 tons. About March 1 it is expected that the city of Syracuse will negotiate for the purchase of 20,000 tons. Carload lots of 6-in. continue to be quoted at $30 per net ton at tidewater.

Old Material.—Consumers appear to be completely out of the market or are purchasing in such small quantities that dealers can hardly be said to be doing any business. The principal transactions are occurring with railroad companies which are now pressing for sale large quantities of all kinds of Old Material and are accepting prices which are often ridiculously low. It is stated that the present offerings of railroad companies in this territory aggregate nearly 100,000 tons. While the following range of prices represents recent transactions per gross ton, New York City, it must be understood that in many instances they have been made under stress and possibly buyers might not be able to secure such rates from the regular channels of trade:

Old Girder and T Rails for melting	$8.50 to $9.00
Heavy Melting Steel Scrap	8.50 to 9.00
Old Steel Rails, rerolling lengths	10.50 to 11.00
Relaying Rails	17.00 to 18.00
Old Iron Rails	14.00 to 14.50
Standard Hammered Iron Car Axles	17.50 to 18.00
Old Steel Car Axles	14.00 to 14.50
No. 1 Railroad Wrought	11.00 to 11.50
Iron Track Scrap	9.50 to 10.00
No. 1 Yard Wrought, long	10.00 to 10.50
No. 1 Yard Wrought, short	9.50 to 10.00
Light Iron	4.50 to 5.50
Cast Borings	4.50 to 5.50
Wrought Turnings	6.00 to 6.50
Wrought Pipe	8.00 to 8.50
Old Car Wheels	15.00 to 15.50
No. 1 Heavy Cast, broken up	12.00 to 12.50
Stove Plate	11.00 to 11.50
Grate Bars	8.50 to 9.00
Malleable Cast	11.00 to 11.50

Metal Market.

NEW YORK, December 11, 1907.

Pig Tin.—The sharp decline in the London market looks as if some large holders were liquidating, and from the known position of several London operators it would appear that this selling came from the far East. It is estimated that surplus stocks of Tin at the Straits amount to 4000 tons. The market is moving down to a normal level, but the price of Tin is still too high as compared with other metals. The continual lowering of prices induced some buying this week, but probably less than 200 tons altogether was disposed of. The following is the week's range of prices:

	Cents.
December 4	30.10
December 5	30.20
December 6	(nominal) 30.45
December 9	29.80
December 10	29.10
December 11	28.40

The arrivals amount to but 239 tons and there are afloat for American ports only 970 tons. Tin from the S.S. Cestrian has been sold at about ¼c. under the spot price. Although this vessel brings but 410 tons it is thought that this small amount will be sufficient to break down the premium which has been ruling for several weeks. The London market closes weak, at a net decline of £8 from our last report, and a drop of £3 for the day. Spot is quoted at £125 10s., and futures at £126 10s.

Copper.—Outside of a rather sharp curtailment of production, there is little new in the Copper market. The decision of the Amalgamated interests to concentrate their working forces on Boston & Montana will cut off considerable production of outside interests, through the closing down of the Washoe smelter. The large exports, which, however, are going into European warehouses, have considerably reduced the piled up surplus here. Added to the record-breaking shipments of the last two months the exports for the first 10 days of December amount to 13,128 tons. There is an evident feeling among the larger producers that there will be a renewed demand some time during 1908. This is shown by the fact that the Guggenheim interests in Mexico are keeping their smelters running. Active work is being done in the underground workings of many mines that are supposed to be closed. Although no ore is being hoisted it is blocked out and when conditions improve there will be plenty of material ready to come out of the ground. Copper for December delivery for cash can be had cheaper than future positions. Lake is nominally quoted at 13.62½c. to 14c., although the large producers are holding to the outside price. Electrolytic can be had at 13.50c. to 13.75c., and casting at 13.25c. to 13.50c. The London market is lower, at £59 5s. for spot, and £60 10s. for futures. Best selected is held at £64.

Pig Lead.—The American Smelting & Refining Company is meeting competition, and the price has broken to 3.90c. for shipments, and 4c. for spot New York. Lead can be had in St. Louis at 3.75c., although this figure is not openly quoted. There has been a little more business at the lower figures but the demand is still much below normal.

Spelter.—Spot metal can be had at 4.50c., and shipments from the West at 4.40c. The St. Louis market is nominal, at 4.35c. There is little business.

Antimony.—The antimony prices quoted last week were below the market, but prices are largely nominal and stocks so concentrated in strong hands that the market can be easily moved. Nominal prices for Hallett's are 8.75c. to 9.50c.; Cookson's, 9.25c., and Outside brands, 7.75c. to 8.75c. The London market advanced to-day.

Aluminum.—There has been a marked change in the Aluminum market. The demand has fallen off considerably, and it is now possible to secure shipments promptly. No. 1 ingots are held on a basis of 37c.

Nickel.—Prices are unchanged, at 45c. for large lots, and 55c. to 60c. for smaller quantities.

Old Metals.—There is so little business doing that prices are largely nominal. Manufacturers using scrap are unwilling to buy until after January 1. Stocks of Metals in the hands of large dealers are small, as there has been little coming on the market during the last two months. As stated before, the following dealers' selling prices for carload lots are nominal:

	Cents.
Copper, Heavy Cut and Crucible	13.00 to 13.25
Copper, Heavy and Wire	12.50 to 12.75
Copper, Light and Bottoms	11.50 to 11.75
Brass, Heavy	10.00 to 10.25
Brass, Light	7.75 to 8.00
Heavy Machine Composition	12.00 to 12.25
Clean Brass Turnings	8.50 to 8.75
Composition Turnings	10.50 to 11.00
Lead, Heavy	4.00
Lead, Tea	3.75
Zinc Scrap	3.75

Figures gathered in connection with the unusual exodus of foreigners from the United States in recent weeks show that the eastbound steerage travel in 1907, up to November 28, represents 447,000 persons. For the same period in 1906 the total was 293,500. The November total this year was 96,724, against 41,933 in November, 1906. The total Italian traffic this year to November 28 was 158,300.

Iron and Industrial Stocks.

NEW YORK, December 11, 1907.

Some improvement occurred in the stock market, up to Tuesday, as an accompaniment of the relaxation in monetary conditions. Holders of stocks seemed less inclined to press them for liquidation, and possibly some buying was done by investors who look for further improvement as financial conditions grow better. On Tuesday, however, conditions changed, and prices fell, dropping in some cases to the lowest of the week. The range of prices on active iron and steel stocks was as follows, from Thursday of last week to Tuesday of this week: United States Steel common 25⅜ to 28¼ (the low price being ex-dividend), preferred 86⅝ to 90½; Car & Foundry common 28⅜ to 33⅝, preferred 85⅝ to 87½; Locomotive common 35¾ to 39¾; Colorado Fuel 18⅝ to 22; Pressed Steel common 17 to 21½, preferred 68½ to 70; Railway Spring common 26 to 30; Republic common 15⅞ to 18½, preferred 64¼ to 70; Sloss-Sheffield common 36½ to 38¾; Cast Iron Pipe common 22 to 22⅞, preferred 56¾ to 58; Can common 3½ to 4⅛, preferred 40 to 41. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 25⅜, preferred 86½, bonds 83⅜; Car & Foundry common 30 ex-dividend, preferred 85⅝; Locomotive common 35, preferred 87; Colorado Fuel 18¾; Pressed Steel common 17⅞, preferred 67; Railway Spring common 26¼; Republic common 15¾, preferred 64; Sloss-Sheffield common 36½; Tennessee Coal 100¼; Cast Iron Pipe common 21¾; Can common 3½, preferred 40.

The American Steel Foundries has issued the following statement of its earnings, including subsidiary companies, for the quarter ending October 31:

Net earnings from operations after deducting manufacturing, selling and administrative expenses, and reserves for management, commissions and contingencies		$657,533.08
Miscellaneous income, interests, discount, &c.		11,531.19
Total income		$669,064.27
Deduct interest on bonds	$58,075	
Sinking fund on bonds	26,250	
Depreciation	55,750	140,075.00
Net income		$528,989.27

The Harbison-Walker Refractories Company for the year ended September 30, 1907, earned net profits of $1,962,168, an increase of $223,086 over the previous year. The surplus after preferred dividends were paid was $932,050, an increase of $155,095. The total profit and loss surplus on September 30 is placed at $2,858,146.

The net earnings of the American Car & Foundry Company for the three months ended October 31 were $2,775,643, compared with $2,592,978 for the previous quarter.

The stockholders of the Westinghouse Air Brake Company, Wilmerding, Pa., have decided to increase the capital stock from $11,000,000 to $14,000,000. Stockholders are to receive $2,750,000 of the new stock as a dividend, and the remainder is to be kept in the company's treasury.

Dividends.—The American Car & Foundry Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock and 1 per cent. on the common stock, both payable January 1.

The American Can Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable January 2.

The American Smelting & Refining Company has declared the usual quarterly dividend of 2 per cent. on the common stock, payable January 15, and 1¾ per cent. on the preferred stock, payable January 2.

The Crucible Steel Company of America has declared a quarterly dividend of 1 per cent. on the preferred stock. This is a reduction of ½ per cent. from the former quarterly dividends paid on this issue.

The Mergenthaler Linotype Company has declared the regular quarterly dividend of 2½ per cent., and an extra dividend of 5 per cent., both payable December 31.

The Otis Elevator Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable January 15.

The directors of the Monongahela River Consolidated Coal & Coke Company, Pittsburgh, have declared a dividend of 3½ per cent. for the last six months on the preferred stock, making the full 7 per cent. for the year. This is the first year since 1903 that the full 7 per cent. dividend on the preferred has been paid.

Ore Mining Curtailment.

DULUTH, MINN., December 7, 1907.—On the several lake ranges the various centers differ materially as to the percentage of curtailment of mining operations. Now that ore shipments for the year are over, this curtailment, if to come at all, is likely to show itself, and it is encouraging to note how slight it is on most ranges and in the chief districts. On the Mesaba range there is considerable of a cut in the number of men employed, though this is not so great as was expected. The Oliver Iron Mining Company, as usual, maintains its operations on a pretty level scale, giving work to as large a force throughout the region as possible. The great proportion of its product is from open pit mines, and these are always closed in the winter. But the company has a large volume of earth to move in stripping, and will continue through the winter, unless plans are changed. This work will be greater than formerly, and will maintain a larger force of labor than is usual in open pit mines. Underground the Oliver Company will undoubtedly run somewhat light. Independent mining companies like the Republic Iron & Steel Company, Pickands, Mather & Co. and others, will be busy. Corrigan, McKinney & Co. are closing down tight everywhere, but there is no telling whether they will resume in a day or a year.

Vermillion range operations will be on about the usual scale. The range has shipped 1,684,865 tons this season, which is about the average for a number of years. On this range there is no development of new mines going on at present. The work of the Shagawa Iron Company, on section 30-63-11, just east of Ely, which has been continued under various managements for several years, has finally ceased, the mining company not being able to get the desired extensions of its options. A shaft is down some 650 ft. The attempt to find ore on this famous tract is again balked, and the land is as far as ever from ultimate development.

On the Marquette range there has been some cut in forces at Negaunee by the Breitung interests, and a few mines of the Cascade part of the region have laid off their men, on account of the fact that they are open pit, and do nothing in winter. But the additional men employed in the vicinity of Gwin and the development of the Maas and other mines at Negaunee are such as to make the general employment of the range ahead of any previous winter, and this condition is quite likely to be maintained till next year.

Around Iron Mountain, Menominee range, there has been little change from the usual winter schedule. The Oliver representatives have been notified from Duluth that operations underground are to be continued steadily, and they employ the bulk of men in that immediate section. Antoine, Dessau and Monroe, all of them summer mines, have closed. On other parts of the Menominee, especially in Crystal Falls, where Corrigan, McKinney & Co. predominate, the conditions are not so good, that firm having closed most of its mines. Oglebay, Norton & Co. have dropped a number of men, and other operators are curtailing somewhat. In the Vulcan section the conditions are little changed from usual, the Penn Iron Mining Company maintaining its operations in full. In the Iron River section the usual conditions will prevail, some of the mines increasing rather than diminishing their forces. The Florence mine, on the Wisconsin side of the river, has let out a large share of its force. All through the Menominee districts the search for new mines is continued without interruption, and this employs a large number of men in the aggregate, while the development of properties that have been drilled sufficiently to show some ore is also proceeding without cessation, with many shafts going down and a large number of men working in drifts and crosscuts. D. E. W.

The Connecticut Valley Metal Trades Association held its annual meeting at Springfield, Mass., November 26 and elected these officers: President, F. H. Page, Confectioners' Mfg. & Machinery Company, Springfield; vice-president, C. P. Fay, J. Stevens Arms & Tool Company, Chicopee Falls, Mass.; secretary, F. C. Breakspear, A. G. Spaulding & Bros. Mfg. Company, Chicopee, Mass.; treasurer, Springfield National Bank; Executive Committee, R. D. Reed, H. B. Smith Company, Westfield, Mass.; M. W. Bushnell, G. H. Bushnell Press Company, Thompsonville, Conn.; F. C. Feiker, Northampton Cutlery Company, Northampton, Mass.; T. J. Rider, J. B. Chapman & Co., Springfield. President M. H. Barker of the National Metal Trades Association attended the meeting and addressed the large number of members present, telling of the work of the national body. J. H. Cone, assistant secretary of the National Association, spoke on other aspects of the work, including trade schools.

Lake Ore Shipments, 41,292,350 Tons.

The total movement of Lake Superior ore by lake in the season of 1907 was 41,292,350 tons, according to figures received by *The Iron Age* from Upper Lake docks. The December movement was the lightest in years, less than 95,000 tons, whereas in December, 1906, the total was 540,594 tons. However, the November movement this year, 4,156,076 tons, was 421,908 tons more than that of November, 1906. The record made in the past season, with so little ore brought down in December, is noteworthy, in view of the strike on the Mesaba range and at the Minnesota docks. In the following table the shipments from the various ports in 1907 are given, with corresponding figures for the three previous years:

Iron Ore Shipments from Upper Lake Ports.—Gross Tons.

	1907.	1906.	1905.	1904.
Escanaba	5,761,988	5,851,095	5,307,938	3,644,267
Marquette	3,017,427	2,791,033	2,977,828	1,907,301
Ashland	3,437,672	3,388,111	3,485,344	2,288,400
Two Harbors....	8,188,906	8,180,128	7,779,850	4,566,542
Gladstone	0	0	0	553
Superior	7,440,380	6,083,057	5,118,385	4,169,990
Duluth	13,445,977	11,220,218	8,807,559	4,649,611
Total by lake..	41,292,350	37,513,642	33,476,904	21,226,664
Total by rail (1907 estimated)	1,000,000	1,008,597	876,552	596,175
Total shipments.	42,292,350	38,522,239	34,353,456	21,822,839

The estimate above for the all-rail shipments is on the supposition that they were equal to those of 1906. They include shipments to the Duluth furnace and to the charcoal furnaces of Michigan and Wisconsin, as well as the ore mined on the Baraboo range and at Iron Ridge, Wis. The United States Steel Corporation's shipments this year were 22,553,642 gross tons, mine weights, against 20,978,651 tons in 1906 and 19,251,872 tons in 1905. The Corporation's percentage this year is 53; in 1906 it was 55, and in 1905 it was 56.

It is to be noticed that the Mesaba range, as heretofore, furnishes practically all the increase in shipments over the preceding year. The total for 1907, as shown above, is 3,770,111 tons greater than that for 1906. The total shipments from Superior, Duluth and Two Harbors are 3,591,860 tons greater than for last year. The old ranges, therefore, have but little more than held their own, with all the activity in development, particularly in Michigan, that has marked the past 12 months.

Independent Coke Operators Organize.—The leading independent coke operators in the Connellsville region have formed an organization, having for one of its objects the curtailing of coke production during the present depression. A meeting of about 30 of these operators was held in Uniontown, Pa., last week, at which O. W. Kennedy of the Orient Coke Company presided. A committee was appointed to formulate a policy for the organization, consisting of Harry Whyel, O. W. Kennedy, G. S. Harah, M. M. Cochran, T. J. Mitchell, A. P. Austin, L. W. Fogg, W. A. Stone and R. L. Martin. Another meeting will be held at an early date to consider the report of this committee.

Public works contracts now under authorization by Greater New York, as given at a meeting of the Board of Estimate last week, represent roundly $197,000,000. The contracts registered and awarded up to November 1, 1907, totaled $75,246,506. Thus the authorized improvements now held up amount to about $122,000,000.

The Machinery Trade.

NEW YORK, December 11, 1907.

With the gradual improvement of the financial situation there has come a much better feeling among machinery houses regarding the outlook for business, which has, apparently, an upward tendency. The opinion that business will assume much greater proportions after the first of the year is held by many prominent houses in this district, and is based to a great extent on the needs of the railroads and the amount of new construction and buying that is being held in abeyance, the desire being to make as few expenditures the closing weeks of this year as are possible. As a consequence business at present is rather light, and not much improvement is looked for for several weeks. During the past week inquiries were few, as is generally expected at this time of the year under ordinary conditions, and, like a great majority of the orders placed, call for single tools. Aside from the large business placed by the New York Central Railroad, the purchases made were not numerous and showed no indication of an immediate resumption of a more active demand. The buying of the railroad has, however, had a stimulating effect on trade and should lead to more activity on the part of other corporations.

A commendable feature of the situation is the total absence of price cutting in the trade. Machinery merchants in this city have been unanimous in their belief that present values are none too high and that no good would be attained by lowering them. They expect normal conditions to resume shortly, when consumers will be obliged to make purchases which they have deferred throughout the present depression, and that all interests will be best served by maintaining as cool and natural a bearing as possible in the meantime. The stand taken by all the leading producers of iron and steel at the recent meeting, at which they decided against price cutting, is referred to in the machine tool trade as the proper attitude. This position is shared by machine tool builders as well as the dealers, and as an evidence of this fact we are in a position to state that representative machine tool builders have visited local merchants within the last week for the purpose of urging co-operation among the machine tool builders and dealers generally to continue the good work in maintaining prices.

New York Central Places $75,000 Order for Machine Tools.

The placing of a $75,000 order for machine tools with the Niles-Bement-Pond Company, New York, by the New York Central Railroad last week was one of the most important happenings in the trade for some time, and, coming at a time when the volume of business transacted was rather light, it is bound to have a favorable effect upon trade. The order, which covered over 60 tools, a large proportion of them of the heavier class, was placed against the list issued two weeks ago, and which was printed in these columns November 28. It will be remembered that at the time the list was sent out machinery houses were requested to submit bids within a few days, and it was intimated that purchases would be made as quickly as possible. The tools are destined for several shops of the road to augment the present equipment, in order to take care of repairs to the increased rolling stock. It is understood from a reliable source that the New York Central Railroad is badly in need of the heavier types of machine tools to make repairs to its locomotives, which have not only increased in number 50 per cent. within the past two years, but have increased in size, while shop facilities have not increased in proportion. Thus the present equipment is not only deficient in quantity, but is, to a great extent, not adapted to such heavy work. This order is said to be the largest purchase of machine tools made by the road for a good deal over a year, and is of especial importance in marking the beginning of what is believed to be an extensive buying movement, which is likely to extend over a considerable period and embrace an extremely large number of tools. That such a movement has been inaugurated by the road and that it is likely to be carried to completion as soon as funds shall become available seems almost certain from the large appropriation asked by the motive power department for the purchase of machinery next year, said to amount to over $2,000,000.

Many other large railroad systems are said to be in the same predicament as the New York Central as regards mechanical equipment. It is believed that the financial situation is responsible for the railroads holding aloof from the market, but as this is now clearing up it will not be surprising to see them make large purchases in the near future. The further extensive installations of mechanical equipment are made necessary by the increased heavier rolling stock being now at a point when repairs must be made. About two years ago the important railroad systems of the country, in order to carry the increased amount of freight economically, not only ordered large numbers of additional locomotives and cars, but those of a much heavier type, particularly the locomotives, and these, having had a year or more of service, are now badly in need of repairs; but facilities are inadequate. It is said that many railroads have comparatively new locomotives standing on side tracks awaiting their turn to go into the shops for repairs. The companies know perfectly well what a loss of revenue that means and will surely act accordingly. From a reliable source it is learned that the New York Central Railroad is in just such a position, and not having increased its mechanical equipment to any considerable extent within the past year, it has been the first to be forced to purchase additional heavy machinery to make repairs on the heavy engines.

The General Electric Company is making important extensions to its plants at Harrison and Newark, N. J., a contract having been recently let for the erection of a three-story reinforced concrete building, 62 x 121 ft., at the former place. The company is completing improvements to its other plants which were started some time ago, but has not yet completed plans for its proposed new plant at Erie, Pa., where it recently purchased a large site.

The United States Coal & Oil Company, Holden, W. Va., intends to rebuild its machine shop, which was recently destroyed by fire, and will install the same kind of machinery as that lost in the fire. No boilers or engines are used, the machinery being operated by a motor.

The Standard Oil Company is now constructing 11 steel tanks for the storage of petroleum at Bayway, N. J., and the machinery purchased a few weeks ago, which was noted in these columns, is, we understand, to be used in the construction of these tanks. The company has plans for extensive building operations at Bayway, and the carrying out of these will necessitate the purchase of quite a large amount of mechanical equipment. The work to be done at that point includes the construction of a refinery, to consist principally of stills, tanks, &c., together with several buildings, all of which will be built by the company's own forces.

The New York Flat Iron Company, Flatiron Building, New York, intends to increase the capacity of its plant at Bellemeade, N. J., and will probably place orders for some new machinery.

J. H. Keegan, who has been a well known figure in the machinery trade for a number of years, and for the last six years was the New York manager of Hill, Clarke & Co., has been appointed special agent by the Cruikshank Company, which is in charge of the West Street Building, West and Cedar streets, New York. Mr. Keegan will direct his efforts toward securing tenants for this building, who are engaged in the machinery, metal and kindred trades.

Chicago Machinery Market.

CHICAGO, ILL., December 10, 1907.

Last week held all the gain that was noted in last report, and while no deals including any considerable amount of equipment were closed, yet the extreme depression of the past few weeks was noticeably absent. This is significant, not because a few more orders and inquiries are coming in, but rather that it is indicative of returning confidence. Freer circulation of currency has helped business locally, and conditions in this respect have improved considerably in outside territory. The season of the year is not propitious for a marked increase in machinery trade under any circumstances, and about all that is looked for this side of the turn of the year is improvement in the financial situation. The present trend furnishes a reasonable basis for the hope that by the middle of January that troublesome phase may be safely referred to as the recent financial stringency. The very fact of an increasing number of people becoming grounded in the belief that the tide is turning is as important an influence in the accomplishment of the hoped for result, as was the contrary sentiment effective in accentuating the depression. When the difficulty of securing currency has been relieved and normal banking accommodations have been restored, a very serious factor in the situation will have been removed. A corresponding betterment in collections will follow, and a long step toward brighter and more encouraging conditions will have been taken.

It is a noteworthy fact that most of the machinery interests in this territory, instead of making wholesale reductions of their working forces, are, to a large extent, keeping their organizations intact by shortening the working hours. One machine tool manufacturer reports sufficient live orders on hand to insure continued operation for at least five or six months to come; this in spite of some cancellations which, in all, have not amounted to more than 15 per cent. of the total business booked. In this connection it is stated that additional cancellations

are not anticipated. Another manufacturer advises that new inquiries are coming in more plentifully, and although they are slow in crystallizing into orders, they indicate requirements that must be met if business is to go on. While there may be differences of opinion as to the degree of activity that will later develop, the feeling is well nigh universal that a demand of reasonable proportions will make its appearance at no distant date.

The Automobile Show, this week in progress at the Coliseum, has attracted a large attendance, in which is included a great number of out of town visitors. Among these there have been not a few manufacturers nnterested in machine tools, as is evidenced by the unusual number of prospective buyers seen looking over dealers' stocks. A fair amount of orders for odd tools have been taken, and assurance of considerable business to come in later has been given. The automobile business has in recent years been prolific of orders for machine tools, and it is feared that in view of recent disturbed conditions not much support would be forthcoming from this source during the coming year. Possibly not as much can be expected from it in the near future as has developed in the immediate past, but, judging from active interest shown by the crowds that viewed the exhibits at the Coliseum, the industry is far from being in as bad a way as might be inferred from the many discouraging reports that have been published. That the interest displayed was not prompted by idle curiosity was manifested by the gratifying total of sales made. Trade of this character bespeaks the possession of resources that, to say the least, are not suggestive of a financially impoverished country.

The Danville Steel & Iron Company, Danville, Ill., has recently been organized and will erect a large plant for the fabrication of structural material to be used in bridges and buildings. A 10-acre site has been secured at Tilton, adjoining the plant of the Danville Car Company, for the erection of the shops. It is estimated that $150,000 will be required to build and equip the plant. The company is now taking figures on machine tools, motors, cranes and other equipment.

B. F. Barnes Company, Rockford, Ill., maker of machine tools, upright drills and lathes, has just completed a one-story addition to its factory, 18 x 260 ft., to be used for the storage of castings. Together with this improvement, both the foundry and casting storage room have been equipped with cranes, and other machinery has been added which increases both the efficiency and output of the plant. While not increasing its working force, business has continued in sufficient volume to warrant the maintenance of the old force, working, however, on a 48-hr. a week basis. It is stated that, judging from the present outlook, there will be no need of further reduction of time.

The Century Electric Company, St. Louis, Mo., will move in the latter part of the present month from its present location at 404 Fourth street to Nineteenth and Olive streets. The company manufactures single phase alternating current motors and ceiling fans, demand for which has increased to such an extent that more room and better facilities were required to handle the business. The new quarters secured will give an increase in floor space of approximately four times that of the old plant. Practically all the new equipment required has been purchased.

The Universal Tool Company, formerly at 47 South Desplaines street, has moved its factory to 215-219 South Clinton street, Chicago. This company, which was recently organized, manufactures a special line of taper shank twist drill sockets and universal steel lathe dogs.

A few weeks ago bids were asked by the Chicago Board of Education on a list of tools required for the equipment of the Lake School. At its last meeting the board decided to reject all bids, and this list, therefore, will be again submitted for bids, either the latter part of January or early in February. An additional list for another school now in course of preparation, and which it was intended to place in the hands of dealers at an early date, will also be deferred for about 60 days.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 10, 1907.

Trade on the whole continues extremely quiet, and such business as has been transacted has been almost entirely of a pick up character. One concern which has had the question of buying a few tools under consideration closed for them during the week, but while considerable other business is pending, it is extremely difficult to get buyers to take hold. The larger proportion of the business done has been in small tools, and but few sales of anything in the way of the heavier class of tools are to be noted. The financial situation, on which are dependent many of the propositions before the trade, shows some improvement and is unquestionably better than it was a month ago; still buyers hold off and will no doubt continue to do so until matters assume a more definite shape. Currency is more plentiful, and there has been but little difficulty experienced in obtaining sufficient to meet current payrolls. Collections are reported as slightly improved, but in many cases they are yet far from being satisfactory. The question of prices has been quite an important item recently, and evidences of cutting are noticeable. This, however, does not appear to have been the case with the higher class of tools, but it is said to be pronounced on some of the medium and lower grades. With the keen competition which prevails for what little business is around, this is rather to be expected, as some dealers, as well as manufacturers, are carrying heavier stocks than they like, and if tools can be converted into cash by means of a slight concession, it is not hard to get it, if the buyer is satisfied with the class of tools he is getting.

There seems to be no disposition whatever shown by the larger users of tools to come into the market, even though they may be badly in need of the equipment. The curtailment policy is being effectively used in every direction and producers of every class of goods are adjusting their affairs so as to meet the changed conditions.

Manufacturers of machine tools are not taking on much new business and are catching up with back orders to a material extent. Plants in many cases have curtailed production, but further retrenchment will be necessary unless business picks up before very long. While some builders are making stocks, the quantity is not large and the tendency in view of the falling market for raw material appears to be rather against accumulating large stocks at the present rate of cost.

There is practically nothing new in the demand for tools for export. Inquiries for the so-termed standard machine tools have been quiet, but there is still some little business floating about for special tools. With the year approaching a close, manufacturers doing a more or less regular export business in power transmission specialties find orders falling off to some extent.

Second-hand machinery dealers report business more quiet. While there was a little improvement in this branch of the trade a few weeks ago, conditions have drifted back into a very light demand. Such sales as have been made are largely for the smaller classes of equipment and business has been light at that. Boiler and engine builders as well as dealers find business very dull. No large propositions show signs of closing and sales are few and confined to the smaller and medium horsepowers.

No improvement is to be noted in the foundry trades. Both gray iron and steel casting plants are running on restricted tonnage. Owing to the general condition of the iron market as well as the uncertain future in their own particular lines, consumers of castings are unwilling to place orders for future deliveries at this time.

C. A. Blatchley, architect and engineer, Drexel Building, has been receiving bids for the erection and some of the equipment for a new boiler house, machine shop and yard improvements for the J. E. Wood Company, American and Diamond streets. A 125-hp. Corliss engine has been already bought, but further needs cover a 140-hp. boiler and power transmission equipment, which may include motor drives.

The machinery business which has been conducted for a number of years by W. E. Shipley, in the Bourse Building, Philadelphia, has been incorporated under the laws of the State of Pennsylvania, and will be known as the W. E. Shipley Machinery Company, with a nominal capital of $10,000, which it is proposed to increase at a later date. The corporation will be a close one, the directors being named as follows: W. E. Shipley, W. E. Cadbury and G. A. Bauer.

Watson & Huckel, architects and engineers, 1211 Walnut street, have completed plans for a large automobile garage, to be built at 229-243 North Broad street. The plans provided for a concrete structure 120 x 120 ft. The building is to be equipped with all modern improvements, electric elevators, &c. The third floor will be used for a repair shop, fully equipped for all classes of work.

With the departure during the past week of a number of the war vessels from the League Island Navy Yard, it is expected that working forces at the yard will be greatly decreased, as many additional mechanics had been employed to get the work of preparation on these vessels completed. At the time there is still considerable work to be done, and it is expected that several of the smaller vessels will be ordered to this yard for overhauling and repairs. This should keep about the usual forces at work.

The Cathcart Coupling Company has been incorporated under New Jersey laws, with its principal office in Camden, N. J. It will acquire the patent rights and will manufacture and deal in a new shaft coupling device, but has not fully decided on its plans in this respect. The incorporators are Dwight D. Willard, Frank Toomey, and Herman D. Winterer.

There has been a long standing contention among the City Councilmen regarding the apportionment of an available sum of $750,000 for new bridges to be built in various parts

of the city during the coming year. This, we understand, has now been satisfactorily adjusted by the Survey Committee of Councils, and an apportionment has been decided upon, covering 15 bridges, running from $200,000 down to $15,000 each. The largest proposition is the Passyunk avenue bridge over the Schuylkill River. Plans, it is said, will now be made, and on completion of these bids will be asked for the respective pieces of work.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 10, 1907.

The local financial situation shows great improvement, conditions in that respect gradually resuming their normal shape, and to a large extent confidence is being restored. The general conditions are reflected on collections, which have improved since money became easier. The improved condition of the financial situation, however, has not been accompanied by a corresponding improvement in the machine tool market. Dealers report their trade fully as dull as during November. They are selling an occasional new tool, and there is some demand for second-hand tools, but there is an entire absence from the market of new inquiries for a fair sized list of tools. New concerns and others that were looking around with good lists of tools before the financial disturbance came on are still holding off and say that they will do nothing before the first of the year, and some of them will wait longer. The feeling is more or less general that after the financial trouble that the country has gone through it will take some time to recover to a state of good business activity, and that with a Presidential election on during the coming year business will be rather quiet for several months to come. Many industrial concerns for that reason are following a cautious policy and are delaying the purchase of new tools for additional equipment to enlarge plant capacity until they see how business starts out early in the year.

Stockrooms of dealers are well filled with tools, and some of them have a few large tools in stock that were sold some time ago and held for delivery, the orders for which were later canceled. With the return of fair business conditions dealers expect a good volume of orders from plants that have delayed throwing out old tools and putting in new ones during the past year because of the impossibility of getting early shipment on new tools.

Some tool and machinery manufacturing plants report a slight improvement in their orders during the past week. Most manufacturing plants, because of the limited number of new orders and the cancellations last month, can turn out the work on hand with their reduced forces, and it is not expected that many of the workmen who were laid off last month will be taken back before the first of the year. With the holiday season and inventory time coming on manufacturing plants do not look for a large volume of orders before the first of the year, but a decided improvement is expected at that time.

Foundries are suffering fully as much as any industries from the present dullness. While all the local foundries have been able to keep in operation, they are running on an average of about one-half their capacity.

The Defiance Pressed Steel Company, Defiance, Ohio, has been organized, with a capital stock of $300,000, by Henry Seither and C. C. Hoffman of Defiance, and W. H. Becker, J. A. Donaldson and Frank A. Seither of Cleveland. The new company will succeed the Cripper Plow Company, which for a long time has been operating a plant in Defiance. The plant is no longer turning out agricultural implements, and the new company was formed by the same interests that have been operating the plant in order to provide a more appropriate name and at the same time to provide for more capital, the capitalization being increased from $50,000. The plant has been considerably enlarged during the past two years and further extensions are under consideration. The new company will manufacture steel beer cases and various pressed steel specialties.

The McMyler Mfg. Company has just closed a contract with an Eastern railroad for the erection of a large coal handling plant. The company reports that its plant is running at full capacity. Since the recent financial disturbance began it has taken orders for several locomotive cranes from the Montreal Light & Power Company, Kansas City Southern Railroad, Toledo Terminal Railway Company and others. The company is now completing a car dumper at Ashtabula, Ohio, and on January 1 will begin the erection of car dumpers for the Baltimore & Ohio Railroad at Lorain, Ohio, and for the Hocking Valley Railroad at Toledo, Ohio.

The Foots-Burt Company, builder of spindle drills and bolt cutters, reports considerable improvement in its business, having received some good orders from railroads during the past few days.

The Standard Pattern Works, 5333 St. Clair avenue, will soon make some improvements to its plant, including the installation of a 65-hp. gas engine built by the Ft. Wayne Foundry & Machine Company.

The Adjustable Collet Company has moved its plant to larger quarters in the Penn Block at 211 High avenue. The company is installing some new machinery, with the view of increasing its output.

David Round & Son, makers of chain, chain hoists and hoisting machinery, report that business conditions have improved with them and that orders are coming in better this month than during November.

The Jeffrey Mfg. Company, Columbus, Ohio, is making rapid progress on the erection of its new machine shop and it will soon be ready for the installation of machinery. The addition is of structural steel, 125 x 300 ft.

The Cleveland Twist Drill Company has established a publicity department as an adjunct to its sales department. S. H. Cox is in charge of the new department.

The Wile Power Gas Company, manufacturer of gas engines and gas producers, has moved its general offices from the Cutler Building, Rochester, N. Y., to its works, 1688-1622 Columbus road, Cleveland, Ohio.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 10, 1907.

A calm, dispassionate view of the situation, taking in the entire range of possibilities, is not at all dispiriting; on the contrary, is encouraging. Plans for large and varied improvements in building of steel plants, machine tool plant additions, alterations and removals and architectural iron industries footed up in September the largest sum for such investment ever contemplated at any one time or during any one year in the history of the Cincinnati field. That none of these plans, so far as can be discovered in a careful and painstaking inquiry, has been abandoned is a matter of considerable pride to local financiers and men of affairs. In September and a part of October the indications at the plants of the companies making tools and allied lines were for extra exertions under full time and all possible pressure for the balance of 1907 and a fourth or more of the new year. In the line of tools and allied lines only has this situation been changed so radically as to deserve special notice. While many of the big plants have reduced time and men to the minimum, it is a fact worthy of special note that none of them have closed down entirely, and some have already increased their forces and resumed more nearly normal conditions.

One of the largest of the enterprises projected for the new year was that of the Block-Pollak Iron Company, maker of steel and iron car axles and heavy forgings, at Steelton, in Carthage. This was outlined as a $1,000,000 proposition. The plans outlined by the company will be carried out, and it is expected that everything will be in readiness to go ahead in 30 to 45 days, according to Treasurer Maurice E. Pollak, who has just returned from a trip of inspection and investigation. On this trip Mr. Pollak gathered data and figures, which will govern the company in accepting bids for the new structures. An experienced Eastern engineer will probably get the contract, which will contemplate such buildings as will permit of the manufacture of blooms and all sorts of steel shapes. The plant is busy just now on contracts in the axle department, running some days double time, others reduced time. In the line of heavy forgings there is little activity.

Reports from the big plants of the L. Schreiber & Sons Company, at Norwood, and the city proper are exceedingly encouraging. At the city plant, which is devoted to the manufacture of structural steel shapes for building purposes, there has been no diminution in the force, and it is now working two hours over the normal time, nine hours. This plant is doing much work for skyscraper buildings in the South, and has orders that will keep it busy for several months of the new year. The Norwood plant, which does the finer architectural iron, bronze and brass work, is running on full time, and the usual force which is expected to continue for the first three months of 1908, Treasurer William A. Schreiber reports no cancellation. Eventually the downtown plant will be moved to Norwood, where the company has 14 to 15 acres of ground and two buildings, each 120 x 400 ft.; pattern shop, 120 x 180 ft., and power plant of 800 hp.

The Ault & Wiborg Company, whose New York building was destroyed by fire during the week, will erect on Northside avenue a building for the manufacture of the varnishes and heavy oils used in its business.

C. J. Kiefer and L. Lowenberg, constituting the Reliance Engineering Company, report prospects very bright for some

new industrial establishments early in the new year, having plans on hand for something like $300,000 for early consummation. A late contract is that for the new municipal plant at Moorehead, Ky., a $10,000 proposition requiring about 100 k.w. for the power plant, and specifications on which are about ready for bids. Mr. Lowenberg of this company reports inquiries considerably improved.

Slowly but gradually is confidence returning to the dealers, and with the resumption of work in the textile mills, railroad shops, etc., and the improvement in the money situation, manufacturers are recovering their wonted spirit, and laying plans for going ahead again. This spirit is especially marked, perhaps, in the case of the Oesterlein Machine Company. Recently this company received an order to ship at once a carload of milling machines which had been held up. Shipment was made December 3. Secretary John Johanningman reports the company running on full time, and no accumulation of machines on the stock floor.

No men have been laid off at the plant of the J. M. Robinson Mfg. Company, which is running 8 hr. 45 min. daily and 4 hr. 45 min. on Saturday. The company manufactures presses, forming tools, cornice brakes, shears and special machinery for sheet metal workers.

In the machine tool colony, as already stated, there is little activity; but the concensus of opinion among the larger concerns, those which have been regarded as the aggressive ones in times of prosperity, is that the bottom has been reached and the tendency from now on should be upward, however slow. Cancellations are now admittedly all in; there are some inquiries, and what to the manufacturers is most encouraging just at this time, there is no cutting of prices. Among the dealers the slump has been felt very keenly—that is, in the line of tools—but those whose business takes them into contracting lines for power equipment are doing well. One of the largest of the local dealers reports the securing of a contract for improvements to the electric light and power station at Troy, Ohio, which calls for equipment to the value of about $24,000. The Hooven, Owens, Rentschler Company, Hamilton, Ohio, will furnish the engines, Fort Wayne Electric Works 360-kw. alternator and Babcock & Wilcox Company the Sterling boilers of 300 hp. Dealers generally report ability to promise practically immediate delivery on most anything in the tool line.

The Portsmouth Machine & Casting Company, Portsmouth, Ohio, is in the market for a second-hand crane of about 10 tons capacity and 60-ft. span.

A reorganization has been effected in the business of the Monarch Specialty Mfg. Company, Columbus, Ohio. George H. Marting, who has been superintendent of operations at the mines and quarries of the Columbus Iron & Steel Company is the new president, and Alexander N. Flora, former secretary of the latter company, becomes secretary and treasurer. Both will give the business their undivided attention, Mr. Flora taking charge of the office, and Mr. Marting having executive charge of operations. The company owns property on the South Side in Columbus, on which it contemplates building a new factory in the spring.

A test of the new Hoadley ditcher, at Findlay, Ohio, is reported to have been eminently successful. For the present the ditcher will be built at the plant of the Findlay Foundry & Machine Company, but eventually it is the intention of the inventor, L. W. Hoadley, to erect a plant.

The Traffic Committee of the National Iron Buyers' Association, recently organized at Dayton, Ohio, by iron buyers of the Central West to secure better rates on iron from the Southern furnaces, met in Cincinnati last week. The members present were Chairman E. E. Williamson, commissioner of the Cincinnati Receivers' and Shippers' Association; W. H. Stackhouse, Springfield, Ohio; J. A. Maher, Middletown, Ohio; W. B. Moore, Dayton, and C. R. Houston, Cincinnati. It is expected that the railroads will be forced to reduce their rates in the face of the light production, and demand which will increase competition for business.

The Pope Tin Plate Works plant at Steubenville, Ohio, has resumed operations in all departments; and two of the tube mill furnaces at the La Belle Iron Works have started.

The Eagle Castings Company, Winchester, Ky., has recently taken in some additional capital, and under the direction of T. G. Cornell, formerly of Louisville, Ky., is rapidly making a name in the list of substantial new concerns of the Mississippi Valley. It was recently incorporated at $75,000.

Among the upper Ohio plants showing marked improved conditions since our last report is that of the Bucyrus Steel Castings Company. Late November saw but a small part of the normal force at work, but on December 1 a full complement of men was employed. During the short shutdown the furnace was given a complete cleaning.

Manager Joseph Merkle of the Ohio Foundry Company, Dayton, Ohio, announces that the cause of the recent strike at the plant was purely one of certain privileges between himself and certain of his men, and that the subject of union restrictions or of hours or wages were not in dispute. Mr. Merkle says it is an open shop.

New England Machinery Market.

WORCESTER, MASS., December 10, 1907.

The situation changes but little in the machinery trade. There is some small demand for machine tools, and scattering inquiries are received by manufacturers and dealers, chiefly the latter. But though business is quiet there is no disappointment in the fact, because no one has believed that the reaction for better times would come until the New Year is several weeks old. The trade realizes that other lines of manufacture, which are nearer to the consumer, must feel the change first, machinery following after as it always must in the natural order of things. On the whole, machine tool production in New England is less than it was a fortnight ago. Curtailment has extended in many works, the exceptions including those who are manufacturing for stock. The curtailment was wholly to be expected, as business on the books was cleaned up, for of course orders have not been sufficiently numerous of late to keep the shops operating on full time with a full working force. Collections are a little better, and the banks are responding to the changed condition of the money market.

A number of announcements of increased production on the part of manufacturing plants were made during the week, including some in metal lines. The American Graphophone Company, Bridgeport, Conn., has started up on full time, with half the full force and the promise of immediately increasing it. The New Departure Mfg. Company, Bristol, Conn., has gone back to a full working schedule. The Dean Steam Pump Company, Holyoke, Mass., is taking back men. The aggregate of resumption of general production in New England is quite a large one.

The watch tool business has not been seriously affected. At Waltham the manufacturers of bench lathes, bench millers and special machinery have been running full, and are still receiving orders which should mean a continuation of their prosperity. Much of this class of machine goes to Europe, but the manufacturers report that the bulk of the demand is for the domestic trade. In Connecticut orders are being received for bolt headers, thread rolling machinery and similar tools.

In manufacturing plants the opportunity is being seized to make repairs and alterations. Many makeshifts have been necessary during the rush of production, pending the time when more thorough work could be done. In many establishments it has been considered the wisest policy to make no expenditure of any kind, pending developments in the money market, but as this has eased up and promises to be normal soon, greater activity is evident in the way of changes and permanent repairs. In some works there will have to be expenditures later for new equipment that will constitute a part of the improvements.

The General Electric Company has posted notices at its Lynn works that it will run four days a week for the present, which will affect about 7500 men. The company has been laying off a considerable number of unskilled workmen, with the intention of replacing them later with a higher class of help.

Two new manufacturing plants, which will begin business immediately, are those of the Westboro Brass Bedstead Company, Westboro, Mass., and the Worcester Railway Supply Company, Worcester. The latter will manufacture a motor driven sand box for use on electric cars, and will occupy the factory at 456 Park avenue.

The A. H. Nilson Machine Company, Bridgeport, Conn., manufacturer of special metal working machinery, has completed the foundation for a brick addition to its building, to be 80 x 80 ft., and one story. The contracts for the remainder of the work are now being awarded. The building will be used as an extension of the company's machine shop.

The destruction by fire of the repair shops of the Boston & Maine Railroad at East Cambridge, Mass., December 6, should have an important bearing upon the company's decision as to the proposed new shops at Somerville, on the Mystic River. The entire group of buildings at East Cambridge, excepting the blacksmith shop and air brake shop, was destroyed, including machine shop and boiler shop, causing an estimated loss on machinery alone of $60,000. The works will not be rebuilt; the land is needed for yard purposes and will be used as such. Consequently repair facilities of the system, at no time during the past year or two adequate for their purposes, are still further restricted. No official statement has been made by the company's officers as to when the work on the Somerville shops will begin, but in the trade the fire last week is looked upon as almost certain to hasten operations. The scope of the plant, as contemplated, is a broad one, including the establishment of great shops for both locomotive and car repairs, but it is not certain that more than the locomotive shops will be built in the beginning. There is a feeling that the contemplated control of the Boston & Maine system by the New York, New Haven & Hartford Railroad may be exerting an

influence toward postponement of the beginning of the work, but, on the other hand, it is quite certain that the New Haven people would hasten to push forward the building of so badly needed an improvement.

The Bristol Company, Waterbury, Conn., manufacturer of recording instruments and belt lacings, is erecting a large addition to its works, to be 53 x 193 ft., and three stories, an increase made necessary by the demand for greater production. The company states that its business is exceptionally good at the present time and that the outlook is entirely encouraging.

The Glastonbury Power Company, Glastonbury, Conn., has awarded the contract for the erection of a power plant on Roaring Brook, in South Glastonbury, to cost $200,000. It is planned to develop 1300 hp., which will be transmitted in the form of electric current to Glastonbury, Manchester and Rocky Hill, Conn., for light and power purposes. Work will begin in the spring, and it is expected that the power will be made available for use in the fall.

The effort is being made, under the auspices of the Board of Trade of Westfield, Mass., to locate the plant of the Simplex Mfg. Company in that place. This company manufactures a device for sealing envelopes, a filing machine and other mechanisms, and is now located at Granby, Conn. The decision as to moving to Westfield depends upon whether financial assistance is given the enterprise.

R. E. Kidder, Worcester, manufacturer of power presses, speed lathes and saw tables, reports that he is receiving frequent inquiries for saw tables, especially from the Middle West, and has booked a number of orders during the past fortnight. He is now building a Daniels planer of unusual dimensions, to plane 60 in. wide.

The Heywood Bros. & Wakefield Company, Gardner, Mass., chair manufacturer, is erecting large fireproof additions to its works, consisting of a factory building 75 x 510 ft., four stories and basement, and an office building 60 x 60 ft., four stories and basement, of brick and granite. On account of the extent of the operations the work has been done in two sections in order not to stop manufacturing in other buildings. The work is progressing at the present time.

All offices connected with Stone & Webster in Boston, Mass., are now located in their own building at 147 Milk street.

Government Purchases.

WASHINGTON, D. C., December 10, 1907.

The superintendent of the United States Capitol Building and Grounds, Washington, D. C., will receive bids until January 15 for boiler feed pumps, centrifugal pumps, motors, cranes and other equipment for the power plant for the United States Capitol and Congressional buildings.

The following bids were opened December 3 for supplies for the navy yards:

Bidder 58, Crocker-Wheeler Company, Ampere, N. J.; 60, Caldwell Bros., South Seattle, Wash.; 83, Diehl Mfg. Company, Elizabethport, N. J.; 89, H. T. Davidson Company, Brooklyn, N. Y.; 102, Frevert Machinery Company, New York; 118, General Electric Company, Schenectady, N. Y.; 136, Hendy Machine Company, Torrington, Conn.; 141, Hallidie Machinery Company, Seattle, Wash.; 142, Hill, Clark & Co., Boston, Mass.; 157, I. H. Johnson, Jr., & Co., Philadelphia, Pa.; 172, Lindsley & Allen Electric Company, Providence, R. I.; 185, Manning, Maxwell & Moore, New York; 210, Niles-Bement-Pond Company, New York; 211, Northern Electric Mfg. Company, Madison, Wis.; 223, Prentiss Tool & Supply Company, New York; 226, Pacific Tool & Supply Company, San Francisco, Cal.; 231, Pratt & Whitney Company, Hartford, Conn.; 250, Sprague Electric Company, New York; 262, B. F. Sturtevant Company, Hyde Park, Mass.; 302, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.; 305, Western Electric Company, New York; 309, Henry R. Worthington, New York.

Class 1. One universal radial drill—Bidder 60, $1989.85; 141, $2020; 185, $1897; 210, $2085; 226, $2083.

Class 2. Two 32-in. upright drills—Bidder 60, $890; 141, $2076; 185, $1906.

Class 3. Two 24-in. upright drills—Bidder 60, $735; 141, $1400; 185, $1420.

Class 4. Two 14 in. by 12 ft. engine lathes—Bidder 136, $2664 and $2558; 141, $2820; 210, $2470; 226, $2627.

Class 5. One 16-in. new model engine and tool lathe—Bidder 60, $1125; 136, $1630 and $1588; 226, $1611; 231, $1808.

Class 6. Two 18 in. by 8 ft. screw cutting engine lathes—Bidder 136, $2890 and $2796; 141, $3206; 157, $2769; 210, $2586; 226, $2855.

Class 7. Two 36 in. by 24 ft. screw cutting engine lathes—Bidder 141, $12,200; 157, $7912; 210, $8500.

Class 8. Two 24 in. by 18 ft. screw cutting engine lathes—Bidder 136, $4698 and $4934; 141, $5450; 157, $4784; 210, $4330; 226, $4941.

Class 9. Two 18 in. by 12 ft. screw cutting engine lathes—Bidder 136, $3100 and $2990; 141, $3374; 157, $2957; 210, $2786; 226, $3059.50.

Class 101. One electric motor—Bidder 58, $85; 118, $109; 172, $96; 211, $85; 250, $87; 262, $103; 302, $106.50; 305, $80.

Class 102. One power drill press and one grinding machine—Bidder 102, $127; 142, $114.50; 223, $108.37.

Class 131. Generators, &c.—Bidder 211, $1777.50.

Class 132. Generating set, &c.—Bidder 83, $719.30, part; 118, $1332.10.

Class 174. One motor—Bidder 118, $1355; 302, $1675.

Class 178. One air pump—Bidder 89, $1275; 309, $625.

Under bids opened November 26 for supplies for the navy yards, the Central Metal & Supply Company, Baltimore, Md., has been awarded class 163, two centrifugal pumps, $340.

The Stoever Foundry & Mfg. Company, Myerstown, Pa., has been awarded class 61, one motor driven pipe threading machine, $1400, under opening of November 19, for machinery for the navy yards.

The following awards have been made for supplies for the navy yards, bids for which were opened October 29:

Niles-Bement-Pond Company, New York, class 52, one 2500-lb. steam hammer, $2000.

Vandyck-Churchill Company, New York, class 62, one nut tapper, $425.

Trade Publications.

Machine Tools.—Marshall & Huschart Machinery Company, Chicago. Catalogue. Size 9 x 12 in.; cloth bound. Pages 151. This catalogue represents the general line of tools handled by the company, which include a number of new and redesigned machine tools, all illustrated by large engravings. Among the new and improved machines shown are: The Bullard 36-in. vertical turret lathe, and vertical boring and turning mills; Gould & Eberhardt high duty shapers, and gear cutters; Whitcomb-Blaisdell three-step cone, double back-geared engine lathes; Whitcomb second-belt drive planers; Owen plain and universal milling machines, with 32 geared feed changes; Prentice Bros. motor-driven high-speed geared-head engine lathes; Star 12-in., 14-in. and 16-in. engine lathes; Hilbert modern radial drill presses; Heald cylinder grinders and ring grinders for automobile work; Baker Bros. cylinder boring machines for automobile work; Quincy, Manchester, Sargent cold saw machines; Hoefer 24-in. sliding-head geared-feed drill presses, and Allen ball-bearing drill presses. The catalogue may be had through either the general office, Chicago, or the St. Louis and Indianapolis branches.

Gas Producer Equipment.—Industrial Power Company, Milwaukee, Wis. Pamphlet. Describes and illustrates the Atkinson automatic gas producers. These equipments are made in sizes of 15 to 200 hp.

Drill Sockets and Lathe Dogs.—Universal Tool Company, 215-219 South Clinton street, Chicago. Pamphlet. Covers a special line of taper shank twist drill sockets, which hold by a patented depressed key and have a patented outside separating device, and a line of universal steel lathe dogs. Both of these were described in *The Iron Age*, November 21, 1907.

The first move for the electrification of a steam railroad in Mexico has been made and has brought with it an order for the equipment to the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., including electric locomotives, power house and general outfit. The improvement is for a small road that operates between the mines of the Las Dos Estrellas Mining Company and a smelter and milling plant some miles away. The plans for this electrification are unique, inasmuch as the locomotives will be of 30 tons weight and of greater power than the steam locomotive. They will use the ordinary direct current, a new feature for this method of locomotion. The company uses in its mines six electric locomotives made in Pittsburgh.

The Iron City Sanitary Mfg. Company, Zelienople, Pa., has had plans prepared for a new foundry building, 60 x 240 ft. The building will be of steel and concrete construction and will be equipped with 16 Herman pneumatic molding machines designed for molding large bathtubs and other sanitary ware. This new foundry is expected to have a capacity for handling 2000 castings per day. The molding and pouring will be continuous, and a conveyor will be installed to handle automatically the molds and sand.

HARDWARE

THE National Retail Hardware Association occupies a high position among trade organizations and much interest and importance always attaches to its meetings on account of their representative character, bringing together as they do delegates from the various State associations to deliberate on association work. Although the attendance is limited in number and not nearly so large as at many of the State associations the influence of the organization is widely felt, as plans for promoting the movement are discussed and determined upon, and the officers of the different associations are brought together, and by conference with one another made familiar with approved methods of working. The suggestiveness of the gathering to those who are doing the real association work in their own State organizations is thus an important part of its usefulness. The plans and purposes thus suggested, the methods of which the representatives of the State associations thus learn, the enthusiasm and earnestness thus awakened, may be presumed to be influential with those who are charged with the responsibility of directing the affairs of the State associations and making arrangements for their annual conventions. How to make the National Association thus helpful to the State organizations is one of the problems which must be considered by those in official position in it, and how to make use of and if possible improve upon the suggestions and stimulus thus given is one of the problems resting on the officers of the State associations.

It is difficult to exaggerate the importance of these State gatherings to the success and usefulness of the association movement. It is in the State associations, as we have already intimated, that the main part of the association work is actually done. One great benefit of the association movement is the bringing of the merchants together and promoting acquaintance and friendship, and one of the charms of every State convention is the fact that it contributes to this most important end. The education of the trade by discussions upon practical questions under able leadership; the consideration of grievances and difficulties which vary greatly in the different sections of the country; the formal expression of the judgment of merchants on subjects on which it is desirable that their interests be authoritatively voiced, as for example, the parcels post question or the methods of catalogue houses, or the sale of goods by jobbers or manufacturers to consumers; the awakening of enthusiasm as well as intelligence in the carrying on of business; increasing the helpfulness of the association to the trade at large—all these can most efficiently be accomplished in the gatherings of merchants from within the borders of a single State, to whom that meeting, so far as Hardware organization is concerned, is the great event of the year. It is scarcely too much to say that the success of the State association is the measure of the success of the association movement.

The practical inferences from the foregoing considerations are obvious. The responsibility which rests upon the National Association is to further in every way possible all through the year the success of the work in the various States, and the greater because more direct responsibility of the officers of the State associations is to make the annual conventions so helpful and suggestive and inspiring that the merchants of the State, who are alert and progressive and have any proper measure of interest in their business, will feel that they cannot afford to stay away.

Condition of Trade.

An eminently satisfactory feature of the situation is the progress which is being made in the direction of normal financial conditions. The feeling of uncertainty and apprehension which prevailed only a few weeks ago is being supplanted by an assurance that the danger of a financial break up or collapse is passed, and that in the near future money will come out of its hiding places and move again as freely as the requirements of business demand. Already manufacturers and other employers are finding little difficulty in getting cash for their payrolls, and this very serious obstacle being out of the way, some of the factories and manufacturing plants which closed under the temporary stress are resuming operations. It is significant of the strength of the situation that so few factories in the Hardware field, and those which are producing the multitude of miscellaneous articles handled by the Hardware trade, were forced to shut up shop, most of them being content to limit the hours of work and relax generally the pressure on their productive facilities. The present condition of things, whatever discomfort it may involve for the time being, certainly gives manufacturers an opportunity for which they have been looking to clean up their order books, get their plants in shape and accumulate some stock for the business of the coming year. This is being done, but on conservative lines, in view especially of the possibility of lower prices for crude material and perhaps also lower wages. There is, however, as yet no very important change in either of these elements of cost, although the tendency is toward concessions. The manner in which the great iron interests are working together to avoid a violent break and unrestrained competition, with the consequent demoralization of values, is doing much to keep things steady and furnish a ground of confidence to the trade at large that any reductions which must come will be made conservatively and reasonably. The trade generally is adjusting itself to the new conditions, accepting philosophically the slackening of the pace and getting things into shape for the quickening of the demand, which is looked for after the opening of the year. Meanwhile jobbers and retailers are continuing to market their goods, reporting fully as large a volume of business as could be expected under the circumstances. Stocks in the hands of the trade are not excessive, partly owing to the lateness of the season and partly to the greater caution in ordering which characterized the buying of some houses, who more or less definitely anticipated a diminished volume of business. There is little disposition on the part of manufacturers to make a general revision of prices at this time, but there are occasional announcements in a quiet way of revised prices, most of which show slight declines. The market as a whole is remarkably steady, and the year draws to a close under much more favorable conditions than might have been expected a few weeks ago.

Chicago.

That business for the month of November showed some falling off from the totals of the preceding month, and also for those of the corresponding month a year ago, occasioned no surprise, but that the actual decrease

proved no greater than it was found to be was in itself most gratifying. Certain it is that the Hardware trade has withstood the impact of reaction much more firmly than many other branches of industry more or less intimately connected with the Iron and Steel industry. This is largely attributable to the fact that it derives its support from the less dependent interests, consumers who, in the Middle West especially, are in the final analysis independent producers, reliant upon their own resources. The purchasing power of this class has passed unscathed through the financial tempests that have stayed the currents of trade in other directions. True, while the ability to buy remains it has not been as freely exercised as it would have been under other conditions, but the records of sales show that it has not been subject to the sharp curtailment seen elsewhere. For some weeks trade has been almost wholly confined to buying for present needs, but within the past few days more of a disposition to consider forward requirements is noted, both in inquiries and actual orders. As yet orders for spring goods are being placed conservatively as to quantity, but the movement indicates an awakening to the fact that the coming of that season will bring with it a demand for which stocks must be provided. Gathering confidence strengthened by a continuance of favorable developments is expected to result in large additions to orders already placed. Among the lines that are now attracting the attention of buyers are Steel Goods, Lawn Mowers, Wire Cloth and Netting. Some moderate orders for such goods are being placed, the majority of them coming from the North and West. The Southwest is still tied up pretty closely by the stringency of money, which is emphasized by the deferred marketing of crops. This section consequently is contributing very little to the general volume of business. Only a fair demand for Wire Nails is experienced, but prices continue firm. There is on the whole no great irregularity in prices, though concessions in some lines are not infrequently obtained on offered business in some lines. Cast Screen Door Hinges are, however, reported to have declined sharply, and are offered at prices scarcely warranted by production cost. The demand for Building Hardware has been helped locally by a demand for the more staple grades, which is supported by a considerable amount of small building for permanent investment. The practical suspension of large building construction is reflected in an exceedingly quiet trade in the higher grades of Building Hardware. From now on to the end of the year interest will be centered chiefly on holiday goods, and no special movement of staples is expected.

NOTES ON PRICES.

Wire Nails.—The mills are kept moderately busy executing orders, but most shipments are on account of old contracts. Specifications on such contracts, while not coming in at all freely, indicate an improving condition in the trade and a greater readiness to take goods than has recently existed. It is noticeable that manufacturers' orders from the retail trade are of relatively greater volume than from the jobbers, who probably have more adequate supplies on hand and at the same time feel the need of special care in purchasing on account of financial conditions. With both wholesale and retail merchants stocks are in most cases only moderate. Prices are remarkably well sustained, but transactions are mostly on the basis of the prices which ruled before the recent advance, a fact which is explained by the number of orders more or less definitely on the manufacturers' books. The policy of refraining from forcing goods on a market which does not call for them is being pursued with commendable consistency, and the existing steadiness of prices is the result. Quotations continue as before as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots, to retail merchants	2.10

New York.—Merchants are pursuing the plan of drawing upon Nail houses and jobbers for their supplies, purchasing in small lots as demand requires. In this immediate neighborhood building is practically at a standstill, owing to the inability to secure capital at reasonable rates to carry on operations. Local jobbers and Nail houses are holding small lots at store at $2.30, base, and except in special instances this price is fairly well maintained.

Chicago.—Notwithstanding a decided slowing up of new business and the receipt of fewer specifications against contracts the mills have not caught up with their shipments. From the Southwest the demand is especially light, owing to the extreme stringency of money resulting from the slow movement of cotton. The past week, has, however, developed fewer requests for postponements and has in addition brought out some forwarding orders. The fact that the time for taking inventories will soon be at hand has been to some extent effective in retarding business. Prices are generally well maintained. Quotations are as follows: $2.23 in car lots to jobbers, and $2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New business being placed in Wire Nails is almost down to zero point, present demand being only for small lots for actual needs. The mills still have on their books some large contracts for Wire Nails placed by jobbers some time ago, but in many cases buyers are not specifying against these contracts, with the result that a very heavy tonnage has been held up. This business, however, will come out later, when confidence is restored, and the money situation improves. It is a remarkable fact that in the almost entire absence of the buying of Wire Nails, prices are firm and the market is being well maintained. This is the result of the policy adopted by the American Steel & Wire Company, Pittsburgh Steel Company and other leading manufacturers not to force their product on the market and to limit output to meet actual demand as nearly as possible. Stocks of Wire Nails all over the country are light and it is believed spring trade will be heavy should general conditions improve in the meantime. Quotations on base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots, to retail merchants	2.10

Cut Nails.—The Cut Nail market is probably getting into better shape on account of the extent to which the mills are curtailing operations or closing up altogether. This restriction of production, it is hoped, will tend to check the irregularity in prices, to which we have heretofore called attention, and which still continues to some extent. At this season, with the prevailing financial conditions, and the near approach of the end of the year, with its inventory, there is a disposition on the part of the trade to buy only such Nails as are required immediately. This limits the volume of business, so that the most that is being done is in the way of L. C. L. lots, and in many cases in execution of orders placed some time ago. We quote in a general way $2 to $2.10 with freight added, but these figures are frequently shaded.

New York.—Demand for local consumption is light, and is confined to small lots, the quotation for such quantities at store being $2.30, base, and this price is generally maintained, though in some exceptional cases it is slightly shaded.

Chicago.—The action of the mills in curtailing production has had a steadying effect on the market. The demand is much too light to absorb the unrestricted output of the full producing capacity, and as in other lines there is no disposition to accumulate stocks. Jobbers' stocks are moving very slowly, but following the policy pursued by the mills prices are on the whole held with reasonable firmness. Chicago quotations are as follows: Iron Cut Nails, carloads, to jobbers, $2.38; to retailers, $2.43; Steel, to jobbers, in carloads, $2.28; to retailers, $2.33.

Pittsburgh.—The manufacturers of Cut Nails have adopted the same policy as the Wire Nail mills in regard to restricting output to meet actual demand, and a good deal of Cut Nail capacity has been closed down and will remain idle until general conditions improve. By doing this it is hoped to prevent accumulation of stocks which

always act as a menace to the market. New demand for Cut Nails is light and is only for small lots and actual need. Prices continue to be somewhat shaded, but in view of the recent action of the mills in deciding to restrict output, it is hoped a more uniform market will result. Our prices continue to be shaded from 5 to 10 cents per keg. We quote Steel Cut Nails at $2 to $2.05, f.o.b. Pittsburgh, for carload lots, and small lots at $2.10, to which freight to destination is added. Iron Cut Nails are being held at about $2.15, at mill.

Barb Wire.—Very little new business is coming in to the manufacturers, and shipments by the jobbers are also few and for small quantities. The market is, however, free from the disturbance which would result in the presence of a sluggish demand with the old-time struggle for business and the effort to effect sales by cutting prices. With the more reasonable spirit which prevails, and consideration for the good of the market as a whole, prices are well maintained and remarkably steady. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—New business has decreased until it adds but little to incoming tonnage. Shipments now being made comprise specifications against contracts, the volume of which is also greatly reduced. But as yet the mills are still busy on orders and are not piling up stock. It is expected that relief from the present restrictive financial condition will be followed by a liberal amount of new business. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.38; Galvanized, $2.68; to retailers, car lots, Painted, $2.43; Galvanized, $2.73; retailers, less than car lots, Painted, $2.55; Galvanized, $2.85; Staples, Bright, in car lots, $2.35; Galvanized, $2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Practically no new business is being placed in Barb Wire, but it is believed that very early in the new year or just as soon as money conditions improve, demand will be fairly heavy. In the absence of practically any new buying, prices are well maintained, this being due to the conservative action of the manufacturers in deciding to reduce output and not attempt to force material on a market that does not want it. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Smooth Fence Wire.—The trade are purchasing but little, as their present requirements are exceedingly limited and there is no disposition to order ahead. Manufacturers of Woven Wire Fencing are, however, doing more than a few weeks ago, and getting ready for the spring business. There is a growing feeling, that not very long after the opening of the year there will be a marked increase in the demand, with the possibility of at least a fair volume of business. Quotations are f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Chicago.—Within the past few days forwarding orders have been as frequent as those for delay of shipment. At the same time consumers are withholding orders for forward delivery, so that about all the tonnage being shipped is on specifications against contracts. Mill representatives, however, view the situation optimistically and look for a favorable turn of affairs after the first of the year. Quotations are as follows: In car lots, to jobbers, $2.08, f.o.b. Chicago, and to retailers, $2.15.

Pittsburgh.—A very large tonnage in Fence Wire, that otherwise would have been placed, has been held up owing to present unfavorable business conditions and the tight money market. It is believed, however, that this tonnage is only "backing up" and will come out just as soon as business conditions improve. In the almost entire absence of new buying we are advised prices are being well maintained. Quotations for base numbers 6 to 9 are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Conductor Pipe, &c.—The market for Conductor Pipe, Eaves Trough, &c., continues to exhibit irregularity, accentuated by lower prices on Sheets. Quotations, however, are probably no lower than have been made for several weeks by the most aggressive manufacturers in sections where the keenest competition prevails. The interests which formerly were acting in harmony are still making efforts to get the situation in hand, but so far without apparent results. The business which is doing covers only small lots for immediate use. Jobbers are making no attempts to keep up their stocks, and as a rule cannot be induced to place orders for next year even on a protected basis. Many mills are practically idle, and the opinion is expressed that if the financial situation clears so that building operations go on actively in the spring there will be a shortage of stock.

Shot.—The expected decline in Shot suggested in our last issue has been announced under date of December 9. Following are the published prics which on ton lots are subjected to an additional concession of 10 cents per bag of 25 lb.:

	Bags.	Per bag.	Bags.	Per bag.
Drop Shot, sizes smaller than B.	25-lb.	$1.85	5-lb.	$0.40
Drop Shot, B and larger sizes	25-lb.	2.10	5-lb.	.45
Buck and Chilled Shot	25-lb.	2.10	5-lb.	.45
Dust Shot	25-lb.	2.30	5-lb.	.50

Chisels and Drawing Knives.—A slightly lower general level seems to have been reached on Chisels and Drawing Knives, although extreme prices to-day are not much if any lower than most manufacturers have been making to their preferred customers for two or three months. The goods, however, may now be quoted 5 to 10 per cent. lower to average trade. It is generally admitted that business is light.

Heavy Tools.—Quotations of some manufacturers on Picks and Mattocks, Crowbars, Heavy Hammers, &c., have been shaded slightly in an effort to secure the light business offering. Where concessions are made in one quarter, a disposition to meet them is shown by other manufacturers.

Auger Bits.—Irregularities which have recently developed in Auger Bits would support the view that the market is now an open one. Quotations are distinctly weak in the face of possible orders for even moderate quantities. Hopes are expressed that these conditions are only temporary, due to present dullness, and that the situation will improve in the spring. The market to-day may be represented in a general way by a discount of 80 per cent. or even a little better.

Bright Wire Goods.—As has been intimated in these columns the line of Bright Wire Goods has for some time exhibited considerable irregularity, some manufacturers soliciting orders without much regard to so-called established prices. The market now appears to be steadier and quotations show a degree of uniformity, the discount to general trade being 90 and 20 to 90 and 25 per cent.

Sash Cord.—The market for Sash Cord is somewhat steadier, the prices reached a week or two ago being fairly well maintained. It would appear that manufacturers have been making concessions because they doubted the stability of the cotton market. The opinion is expressed that the present price of Cord is quite low enough and in fact discounts a further decline in cotton.

Rope.—With manufacturers this month is usually quiet, and in January comparatively little business is expected. December conditions are more pronounced this year, owing to the prevailing inactivity of business. The following quotations fairly represent the market for base sizes: Pure Manila, 11½ to 12 cents; B quality grades down to 8½ to 9 cents; Pure Sisal, 8 cents; lower grades Sisal, 7 to 7¼ cents; No. 1 Jute, ¼-in. and up, 7½ to 8 cents; No. 2 Jute, 7 to 7½ cents.

Window Glass.—It is stated, upon good authority, that the American Window Glass Company has made

a reduction in prices, the present quotations being 90 and 30 per cent. discount for single and 90 and 40 per cent. discount for double strength Glass. The new prices are said to carry with them stipulations to the effect that orders are to be restricted to not more than 15 per cent. of A Glass, nor more than 50 per cent. of the order applying on the first three brackets, all specifications to be subject to stock and approval. Two views are taken of this action of the company and each may have some bearing on its cause. One view is that the object of reducing prices is to make hand operated Glass manufacture still more unprofitable and cause the closing down of additional factories during December and January. Then if a spring demand should materialize, the company would be in a position to take the cream of the business at its own prices. Another view is to the effect that the company has produced considerably more Glass than there has been an outlet for, in competition with prices made by hand operated factories working on the co-operative plan. Additional factories have closed down since all prospect of arranging with the workmen for a sliding scale of wages has been abandoned. Business at this point is quiet. Prices recommended at the last meeting of the Eastern Window Glass Jobbers' Association are as follows: In the States of New York and New Jersey 90 and 15 per cent. discount for single and 90 and 20 per cent. discount for double strength Glass. Similar prices are supposed to prevail in Pennsylvania, but in New England discounts are said to be fixed at 90 and 20 per cent. for single and 90 and 25 per cent. discount for double strength Glass.

Linseed Oil.—The local market has become somewhat more steady during the week, owing to the fact that odd lots have been disposed of by their holders, and are now out of the way. Demand is inactive, and is confined to small lots to satisfy immediate requirements. Quotations are as follows: State and Western Raw, in 5-bbl. lots, 43 cents; City Raw, in like quantities, 45 cents, with 1 cent per gallon addition for less than 5 bbl. Boiled Oil is 1 cent advance on Raw Oil. State and Western Raw Oil is held at about 42 cents in carload lots for delivery during the present month.

Spirits Turpentine.—During the week trading has been sluggish at this point, covering only immediate requirements. The New York market is represented by the following quotations: Oil Barrels, 48 to 48½ cents; Machine Made Barrels, 48½ to 49 cents. Press reports indicate Turpentine operators in southwestern Georgia have made no money this year, and that the majority have lost money, owing to the shrinkage in the prices of Turpentine and Rosin, while the cost of putting these products on the market has shown no decline. Concerted action on the part of the operators to curtail production is being seriously considered.

JOHN L. SARDY of London, England, whose letters descriptive of conditions in various foreign countries have appeared in these pages, has completed his tour of nearly two years and is now in New York City, making his headquarters at the Hardware Club, of which he is a member. Mr. Sardy expects soon to return to London, as the representative of other American manufacturers beside those with whom he is at present connected, having improved the facilities for reaching foreign markets as a result of the trip around the world in the course of which he visited most of the important colonial and other foreign markets.

W. E. DIEHL, for several years sales manager of Russell & Erwin Mfg. Company of New York, will on January 1 take charge of the Chicago office of the Corbin Screw Corporation, becoming manager of the Western business. Since the first of December, Mr. Diehl has spent some time at the factory in New Britain and is now in Chicago familiarizing himself with his new field. In the important position which he is assuming, Mr. Diehl has the congratulations and good wishes of a host of friends in the East.

INDIVIDUALITY IN STORE KEEPING.

A STORE can be made to a great extent its own best advertisement, just as a newspaper or magazine is its own best recommendation to public patronage and popularity. Not alone by appearance, nor yet alone by its contents, but by both, combined with service of exceptional character.

In planning store arrangements and window displays it pays to put individuality into the work, and this does not imply freakishness or eccentricity for the mere sake of being different, but thought along practical lines that will draw favorable attention to the store and its goods and thus result in sales.

Large Capital Not Necessary.

Examples will occur to our readers of stores which have marked their efforts with such individuality that their style and character have become to them no small asset in the conduct of the business. Some of these are large concerns, operating a chain of stores, and the objection has been heard that they are in position to plan and execute elaborate schemes of display which the local merchant conducting a single store cannot afford. There is really little foundation for such an objection, as there are several notable examples among specialty stores in the larger cities where success is being attained along similar lines, though the proprietors operate but one store. Extremely novel and elaborate fixtures have been adopted in some instances, and in the clothing and furnishing trades particularly, apparently well founded traditions have been completely upset.

In a recent interview a well-known merchant operating a chain of stores attributed his success wholly to novel window and store displays, supplemented, as his enterprise grew, with newspaper and billboard copy which possessed distinctive force and individuality. As at the outset he did not have money enough to advertise in the customary way, he hit upon the idea of out of the ordinary window and store arrangements.

Practical Variation of Methods.

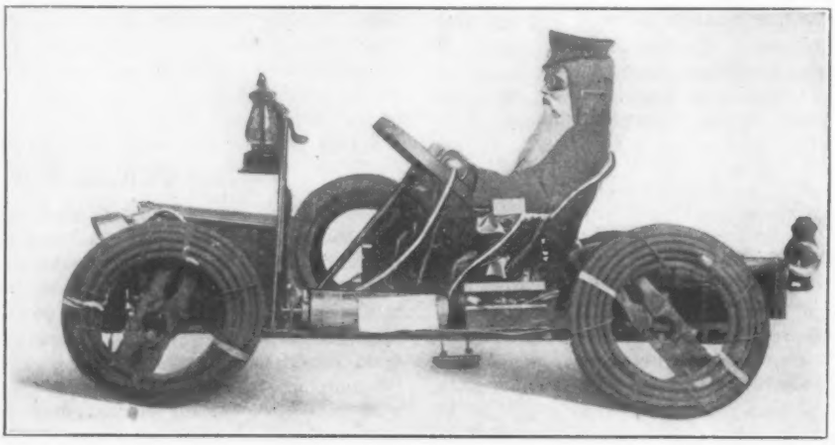
The point is just this: Cannot the local Hardware merchant employ certain variations of the unique and sucessful methods used by others to his own great advantage? It is worth while to note in considering these things that the men who have made successes by the use of novel methods are not the men who have depended upon freakish or irrelative displays at the expense of the merchandise in question, but rather they are the men who have placed their merchandise *first*, and above all else, and then worked out plans to draw attention to it and impress its merits upon the public mind. There are many articles in the Hardware line that could be sold in much larger quantities than are being sold at present if similar methods were employed.

THE THOMAS LAUGHLIN COMPANY, Portland, Maine, has recently increased its capital stock from $125,000 to $350,000 in order to enlarge the business in new lines of manufacture. While it will continue to increase its line of Marine Hardware and Tackle Blocks, as in the past, it will not confine itself entirely to this class of goods. It has purchased a controlling interest in one of the largest factories of Brass Marine Hardware in the country, so that it now manufactures and controls an exceptionally complete line of Galvanized and Brass Marine Hardware. It refers also to its facilities for the manufacture of Drop Forgings, Galvanized and Brass, Malleable and Gray Iron Castings, which have been more than doubled within the last three years.

EARLY in November a New England Hardwareman made a hit with a window exhibit devoted to "Hen Coop Repairs," this inscription appearing on a large sign occupying a central position in the window. Other much smaller cards were used freely in connection with the articles shown. The window simply and inexpensively arranged proved a trade winner, its effect being such that the merchant will repeat the display with a little modification next year.

HARDWARE AUTOMOBILE IN WINDOW DISPLAY.

THE retail department of Babcock, Hinds & Underwood, Binghamton, N. Y., is one of the most convenient and attractive stores in that section of the State. All facilities for the accommodation and display of goods are effective and up to date. Special attention is paid to window dressing, as the firm has large windows that command attention and well repay all thought and effort devoted to them. The Hardware automobile illustrated herewith was recently a feature of one of the windows. The machine was about 10 ft. long by 2 ft. wide, and the frame was made by nailing together with cleats two 1-in. boards 10 ft. long and 5 in. wide, wih a 6-in. space between. The wheels were made by tying coils of Garden Hose on Pulleys of suitable size, which were fastened together with Bolts about 3 ft. long. The frame rested on these Bolts. After the frame had been constructed in this way all other necessary parts were arranged upon it. An inverted Freezer with the crank showing in front served as the engine, with a Register Face as the Radiator, both being covered with a folding Hearth Screen. A Dash Lantern was the headlight, and a Funnel with Bathroom Spray for bulb and tube represented the horn. The dash itself was made with an Adjustable Screen and Serving Tray. The speedometer was an Alarm Clock. An extra tire was represented by another Coil of Hose. For the steering wheel a long Bolt and Wheelbarrow Wheel were fixed in place behind which was a Sitz Bath Seat. A Soap Dish clearly shown in the cut served as a step, and a Cash Box filled with Tools as a Tool Box.



Hardware Automobile in Window of Babcock, Hinds & Underwood.

The running board was a sheet of Copper on Cleats. A large sample case behind the seat took the place of a trunk, and a Carriage Lamp was posted as a tail light.

The driver was constructed by stuffing a coat with Cotton Waste and affixing a false face head with auto cap and goggles. Nail Claws, one resting on the steering wheel and the other on the lever, represented hands. For the levers, which do not show in the picture, a Fireplace Poker and Shovel in their stand were used. The floor of the machine was covered with Rubber Belting and a Rubber Lap Robe was spread over the imaginary legs of the figure, adding much to the realism of its appearance. Scattered about the window in effective array were Wrenches, Oil Cans and other appropriate goods, while card signs were added to emphasize the display.

FRED BUCK, vice-president and general manager of the Lufkin Rule Company, Saginaw, Mich., returned to this country from a business trip to the company's London branch, December 8, on the Amerika, having left here for England in September last. Accompanying him was W. C. Bexfield, manager of the Lufkin European office, 24 Holborn, London, E. C., who came over for a two weeks' visit here and to participate in the annual conference of managers and selling force at the company's office in Saginaw next week. Mr. Bexfield says the introduction of Lufkin Tapes, Rules and kindred Lufkin products has progressed satisfactorily in Great Britain and on the Continent since the establishment of the present depot, where a complete stock is carried.

A CONVENIENT WAY OF HANDLING ROPE.

PLACING a coil of Rope in a tub or a barrel cut down to proper hight, as shown in the accompanying illustration, keeps the coil in better shape than when unsupported, and permits moving the coil about, even after

A Convenient Way of Handling Rope.

most of it has been sold, without its falling down or becoming tangled. Coils of Rope standing on the store floor or in the basement are apt to become dirty and present an unsalable appearance. By keeping them in a tub this is prevented. This idea was put in practical use in the Hardware department of Paul C. Taylor's establishment in Belmar, N. J., by Leo Fielder, one of the employees.

AMONG THE HARDWARE TRADE.

The Hardware and Implement firm of E. L. Scott & Co., Oakesdale, Wash., composed of E. L. Scott and O. E. Hailey, is about to open a store at St. Mary's, Idaho, under the style of Scott & Hailey.

The Austin Hardware Company, Terre Haute, Ind., has been incorporated, with $30,000 capital stock. The directors are Christian A. Hansing, Nicholas Kadel, Edward J. Kadel, Victor E. Schuh and Arthur Jobe.

Geo. Soedler & Sons, Peru, Ill., has purchased from John Hoppler his stock of Hardware and Implements, which they have consolidated with their own stock.

The Rockton Hardware Company, Rockton, Ill., has begun work on a new two-story and basement concrete building, which when completed it will occupy with a complete stock of Hardware.

Trade in British India, Burma and Ceylon.

BY JOHN L. SARDY.

(Concluded from our last issue.)

Bombay and Calcutta.

Bombay is said to be the most progressive city in India, with its population of about 800,000, but Calcutta is somewhat more important from a business point of view and possesses a larger population, considerably over 1,000,000. Madras comes next.

In Calcutta the bulk of the business is dominated by English firms, but in Bombay the larger part of the trade is in the hands of Mohammedans, Hindus and Parsees, men to be ranked among the clever business men of the commercial world, but their methods are not according to American ways. For instance, there is a Mohammedan Hardware dealer in Bombay whose establishment consists of a small shop fronting on the street, with a warehouse at the back, about 20 ft. wide by 40 ft. long, dimly lighted by only one window and a solitary lamp carried about by an attendant; yet that Hardware dealer does a business all over the Bombay Presidency, and although he employs no travelers, his trade amounts to a very considerable sum. He pays his obligations in actual cash, contained in a cotton cloth holding rolls of bills, some of them to the value of 1000 rupees each.

He transacts his business sitting squat on the floor of what might be called the show front part of his shop, but there is no show case, it is all open, neither are there any chairs; no room for them. He imports Hardware to a considerable extent from the United States and is always glad to meet an American traveler and do business with him if the goods are to his liking and the prices suit him.

In all there are only five native Hardware dealers in Bombay, who are actual importers, the others buy locally.

Increase in Imports, Exports and Manufactures.

Fifty years ago exports from Bombay amounted to something less than 60,000,000 rupees per annum, and imports to a little more than 47,000,000 rupees, the rupee roughly being worth 32 cents. To-day the exports and imports are about 10 times as much. The exports of cotton alone run up to something like 100,000,000 rupees. The spinning and weaving industry is very important. About 30 years ago there were 27 mills in Bombay working something less than 800,000 spindles and nearly 8000 looms, employing an average of almost 14,000 hands. Since then the increase has been remarkable. There are now about 90 mills with nearly 3,000,000 spindles and about 25,000 looms, affording employment to 90,000 hands or more.

In 1877 China and Japan took over 28,000 bales of Indian cotton yarn. Last year the quantity was not far from 600,000 bales, all of which went to China. Since 1892, the Indian yarn trade with Japan has been steadily growing less and less until now it has ceased altogether.

Besides the native dealers there are several up to date English Hardware firms in Calcutta, notably two whose establishment dates back many years, in fact one of them is said to be the oldest English Hardware firm in all India. The premises occupied are most extensive and part of the building is the house formerly used by Warren Hastings as a residence or council chambers. This firm as well as the other English Hardware houses do an extensive trade in American goods, but their imports from England are greater.

American vs. English Salesmanship.

To give an idea of the wisdom on the part of a manufacturer to send a competent traveling representative to India, and for the matter of that to other parts of the world, an instance may be cited concerning a well known American manufacturer supplying the Hardware trade, who engaged the services of a traveler some 12 years ago on a journey around the world. In due course he arrived in India and found his employers' goods were unknown there, although there was a very large sale for similar goods made in England. The English maker had held the trade for years and felt so secure of his position that he adopted the foolhardy policy of dictating to his customers, and whenever he felt like increasing his prices he did so. Furthermore the goods were so well known that every dealer felt compelled to handle them, with the result prices were cut to such an extent that scarcely any profit remained.

Along comes the American traveler with his samples. The goods are quite as well made as the English article, the prices are lower and the American manufacturer does not dictate. All the same, the prejudice in favor of the old-time English make was so great the traveler could do no more than obtain a few sample orders. But what was the result? Twelve years later the same traveler for the same American company finds himself in India again, and upon visiting the bazaars or native shops he sees the American article in every one of them, and to-day hundreds and hundreds of cases are being regularly shipped to the various Indian ports. The English make is gradually being ousted and the American is creeping in.

Troubles Vary but Do Not Cease.

In India the manufacturer is not troubled with strikes, but he has another trouble. As a rule work people are not paid weekly, but once a month. There is a reason for this. Once they get their wages, off they go on a drunk, which usually lasts about three days, then they come back and go to work again. The Bengalis are clever workmen, but they must have their monthly spree. A coolie woman in India earns about 2 annas, say, 4 cents per day, and a coolie man about 4 annas, a good blacksmith or carpenter from 1 to 1½ rupees per day. When, as it sometimes happens, they get a little extra pay, they turn to the toddy bottle and enjoy themselves.

Primitive Methods.

The rate of wages paid seems absurdly low, but it must be borne in mind that it takes about a half dozen coolies to do the work of one ablebodied white man. For instance, in such a simple thing as planing two men are required, one to push the plane, while the other helps him by pulling it. When a long handled shovel is used as a scoop on the roads and in railroad work it requires three coolies to handle it. One holds the handle, another presses the shovel down on the ground, while the third pulls it along with a rope.

Even such a simple thing as grinding a knife requires two operators, a boy and a man. The latter does the grinding and the boy turns the stone. But what a stone! Our grindstone makers would of a surety be surprised at the contrivance. Of framework there is none; two sticks are driven in the ground, on which the crude spindle of the grindstone fits. Around this spindle is a cord, which the boy draws back and forth, thus revolving the stone first one way and then the other. Our fellow creatures in British India certainly understand the ethics of the division of labor and practice it.

Can Adaptation.

In a previous article the various uses the Standard Oil Company's tin cans were put to by Oriental races was touched upon. In India, where parrots abound, these cans are transformed into ingenious and perfectly serviceable cages, complete with swinging hoop, feeding dishes, sliding door, hangers, legs, perch, &c., and the whole thing can be bought for about 25 cents. They also make a pump out of this ever useful can. It is used for pumping oil from the can. It consists of the barrel, with spigot for discharge, tin reflux valve at bottom, tin handle attached to the tin piston rod, on the end of which is a plunger which consists of a plain tin disk without any packing. In all, there are about a dozen parts. It costs 3 cents and works very well. We who stay at home may know a good deal, but we do not know everything.

How Business Is Sought.

Seeking business in India would be a revelation to an active Yankee drummer. There is no such thing as walk-

ing about carrying samples. Calls upon possible customers are comfortably made in a carriage, always, however, with the fear that the more or less reckless driver will run over some one of the horde of natives packing the roads where perforce they walk, owing to the absence of footpaths.

Appointments are made to inspect samples at the hotel, and everything is done in a leisurely fashion; no rushing about as we are accustomed to in America. Then again, there are only four days in the week when business calls can be made on English firms. The weekly "mail day" is sacred, and Saturday is always a short day and no good for business.

An Exceptional Bombay Hotel.

India cannot boast of its hotels, but there is one in Bombay which is excellent. The Taj Mahal Palace Hotel, with its spacious dining room fronting on the water, its really perfect cuisine and everything else to make one comfortable, is in strong contrast to the hotels in other parts of India. Electric bells are used in the hotels, but they are somewhat different from the ones we are accustomed to. The native servants have a habit of falling asleep standing, sitting or lying down at any time of the day or night, so the bell is so arranged that one press on the button keeps it ringing, not like an alarm clock, but a slow ring every second until the servant is aroused, stops it and answers the call.

The arrival of passengers by a great P. & O. steamer from England at the Taj Mahal Hotel is a sight to remember. Gharis (carriages) one after the other are driven into the courtyard, and the more or less excited occupants alight and immediately begin fighting with the ghariwalla, or driver, about the fare, and as neither of them in most cases knows the other's lingo confusion results until the hotel porter comes to the rescue. Then there is the scramble for rooms, for big as the hotel is, on steamer days it is quite unable to cope with the rush.

Why any one should squabble with the ghariwalla over the fare is difficult for an American to understand, the cheapness compared with the New York cabman's charges being so marked. In Bombay, within the inner radius, or "Fort," as it is called, a good victoria, with one horse and driver, can be hired for 8 annas, say, 16 cents per hour. In Calcutta the price is 1 rupee for the first hour and 8 annas for succeeding hours. In Madras it costs from 4 to 5 rupees per day. In both these latter places the victoria is equipped with two horses and driver and footman in picturesque native uniform.

Automobile Progress.

Notwithstanding the cheapness of horse drawn vehicles the use of automobiles in India is steadily on the increase. Bombay leads with about 600, Calcutta next with somewhat less than 500, and Madras and Rangoon, say, about 100 each, besides a goodly number in use up country. There is a rajah in India of whom it is said he buys everything in three dozen lots. At any rate he has 36 automobiles, to say nothing of 36 elephants to hunt with.

Elephant Power.

The elephant in India is not only used for the sport of hunting. This intelligent beast is to be found at work in timber yards in various parts of India, stacking or handling huge pieces of timber. The size seems to make no difference. His trunk is apparently equal to any weight, and the way he can stack up timber is a wonder. Sometimes, however, he strikes, or, in other words, becomes for the time being a "mad elephant" and has to be securely chained to prevent trouble.

Burma.

Burma has an area, including the Shan States, of over 236,000 square miles, and a population of about 10,000,000. It lies to the east of the Bay of Bengal, is bounded on the north by China and on the east by Siam. The first Europeans to settle in the province were the Portuguese, at the beginning of the sixteenth century. It cost Great Britain three wars before the whole of Burma was annexed to the empire, which took place in 1886 after the capture of King Thebau. About 50 years ago Rangoon was described as "a collection of mat huts in a swamp." To-day it has a population of about 300,000 and ranks among the chief cities of the Indian Empire.

The Rangoon-Prome line was the first railroad opened in Burma. This occurred in 1877, and its length was 161 miles. To-day the total railroad mileage is over 1300 miles, and additional lines are being constructed. Rangoon itself is a well laid out town, with a good water supply, and a system of electric lighting and tramcars is under construction.

Exports of Rice, Timber and Rubber.

The principal exports are rice and timber. In Lower Burma alone there are about 7,000,000 acres of rice producing land. The cultivation of rubber is receiving attention and is fostered by the Government. The climate is suitable and the industry is profitable. As an instance, a Chinaman who planted 800 out of 5000 acres of waste land was offered £80,000 sterling (about $390,000) for his rights.

Next to imports from England come American, and of the manufactured goods a fair proportion consists of Hardware. The commercial traveler who gets as far as British India proper should not neglect to visit Rangoon in Burma.

Ceylon.

Ceylon is a prosperous island of some 25,000 square miles, with a population of about 4,000,000 people, of which Europeans comprise about 7000. Colombo is the capital, with a resident population of about 175,000, but with a vast floating influx of people from many parts of the world en route to India, Australia, &c.

The total annual trade of Ceylon is about $75,000,000, most of which consists of exports of tea, coffee, rubber, cinnamon, &c., and from the American Hardware manufacturer's point of view it is not an important market.

To sum up the entire Indian Empire requires indeed a gifted pen, but to do so commercially so far as the American manufacturers' interests go, requires only the common sense pen of business which concludes this article by advising those manufacturers of our country who are seeking a foreign trade to send competent representatives to that part of the world containing about four times as many inhabitants as there are in the vast markets of the United States. The Indian rupee can readily be exchanged for the almighty dollar and there are no end of them ready for investment in manufactured goods from the United States, including American Hardware.

E. A. Rea, Corydon, Iowa, has purchased the stock of W. S. Walker, Bonaparte, Iowa, and will continue the business at the latter place. The stock includes Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Sporting Goods, &c. The store has lately been equipped with Warren shelving, making it more convenient and attractive.

J. S. Hanzl & Co., Dodge, Neb., has disposed of his Implement business and will devote his entire attention to his other lines, which include Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Sporting Goods and Buggies.

L. T. Fuller, formerly with Fuller-Cook Hardware Company, Houston, Texas, has formed the firm of L. T. Fuller & Co., which is engaging in the Shelf Hardware, Stove and Sporting Goods business, at Houston.

The Foy Hardware Company, Eufaula, Ala., is about completing a finely equipped store, of which it will take possession January 1. The erection of this building was rendered necessary by the rapid growth of the company's wholesale business during the past year.

J. O. Johnson, De Forest, Wis., dealer in Agricultural Implements, Gasoline Engines, Vehicles, &c., will this year build a new warehouse, 40 x 80 ft., and is contemplating the erection of an additional store in the near future.

Holiday Trade in The Hardware Store.

Sixth Article.

THE CHRISTMAS STORE.

BY CLARFIELD.

SO much is being said and written about Christmas advertising and window displays for the Hardware merchant that a word about the Christmas store should not be amiss. Hardware merchants are becoming more and more alive to the fact that they can materially increase their trade at this gift season, and get a liberal share of the patronage which the spirit of the occasion creates, if they will only push to the front by display and suggestion the practical things from their stocks which make acceptable and useful gifts. Still, as yet very little has been said, and in most Hardware stores very little is done to make the interior arrangement and merchandise displays of particular suggestiveness along these lines.

Special Store Displays Valuable.

It is well worth while to make the interior of the store reflect as much as possible of the holiday cheer. The effect of music upon a buying throng has often been noted to be of distinct advantage in large stores, where concerts were given on special occasions, and while it is not often possible or advisable for a Hardware merchant to undertake anything of this kind, nevertheless special store arrangements and displays will be found extremely profitable.

A Complete Change of the Store Appearance

should be made. This can be accomplished by rearranging the displays in the showcases and on the special tables and shelves, bringing all sorts of articles suitable for gifts into prominence at the expense of the usual displays of staples. Counters should carry an entirely different line of samples, if possible.

Not Necessarily Expensive.

The expense of such an undertaking is absolutely within control of the merchant. Unless elaborate special displays are planned, there should be very small extra expense involved. Crepe tissue paper with holly designs can be employed effectively for floors and backgrounds of showcases, and an occasional spray of holly showing the red berry can be used in the cases. The same scheme works well as a covering for aisle tables and for unused ends of counters where holiday goods may be shown.

Clusters of holly tied to the chandeliers will also be effective, but they should be kept well away from open gas jets, as they become dangerously inflammable when they have dried out. A suitable floor for a Skate display can be made with cotton batting over which has been sprinkled tinsel or mica for frost effect, but this plan also is best when confined in a showcase well away from any possible contact with fire.

Avoid Inflammable Displays.

Ropes of Virginia creeper, holly or hemlock are always attractive, but they are dangerous in so public a place as a store, and often conflict with insurance regulations, whereas an occasional wreath or cluster of holly, judiciously placed will accomplish practically the same result. The paper ropes so often used in such displays are open to the same objection.

Papier maché or plaster figures of Santa Claus can be obtained in the average toy store for a nominal sum, and a few of these placed in and about the various displays will help to carry out the idea. The chief idea to be borne in mind is not so much to make a pretty or elaborate display as to make one that will at once be suggestive of the spirit of the Yuletide and set out the goods that the merchant has to sell on this occasion.

"The Night Before Christmas."

If the store is a large one and some corner or special space can be spared for a feature display, then such a one can be arranged at nominal cost, and if properly handled will be enough talked about to become an advertisement in itself worth while. A scene such as "The Night Before Christmas" can be arranged in a small space by utilizing a mantelpiece with an open grate, in which the effect of a coal fire can be obtained by the use of electric lights. Upon this mantel stockings can be hung, and articles of Hardware, such as Skates, Knives, &c., should be seen protruding from their tops. Upon the mantel and around it should be other articles suitable for gifts, chosen from the stock.

If space permits this idea can be carried out on a very elaborate scale, and fully half or an entire side of a room can be shown just as it might have been arranged by Santa Claus on Christmas Eve, with a Sled, Skates, Snow Shovel, Carving Set, Carpet Sweeper, Bicycle and other articles apparently left there as presents for various members of the family.

A figure of old Santa himself, with his pack filled with articles from the store, will, of course, prove a great drawing card for the little folks, and if the little folks go to the store their elders are pretty sure to go with them. This figure can be made of a clothing dummy and a Santa Claus mask, and the whole display will cost little more than a couple evenings' time.

A "Real Live" Santa Claus.

It often pays to have some one impersonate Santa Claus in costume. Then advertise a "real live" Santa and invite the children to come and talk to him. The idea is further carried out in some stores by giving the children a book or a small present.

Such feature displays, in addition to making the store more attractive, always create a great deal of comment and often get valuable mention in the local papers. There is broad opportunity for Hardware merchants to increase their December business with such plans as these.

A HARDWARE CLERK'S FIRST EXPERIENCE WITH CHRISTMAS BUSINESS.

BY FAR WEST.

"WE have a gay time here during the holidays," Canthook remarked to young John one evening as they were sweeping out preparatory to closing the store. "When the toys are out this looks like a different place." "Toys!" exclaimed John, who had been a Hardware clerk for only a few months, "whoever heard of toys in a Hardware store?" "Oh, we sell anything here people want," replied Canthook, giving his broom a parting fling which swept the refuse into barrels kept for that purpose in the alley by the side door. "It makes long hours, but there is fun in it, too. Crowds of people, everybody good natured, and selling is easy. That's what I like about it. You don't have to talk an hour to sell a nickel's worth."

"I wouldn't think it very easy if you don't know anything about toys," objected John. "It is all in the arrangement and marking of the goods," explained Canthook. "Where do you put them?" asked John, glancing at the crowded shelves. Canthook swung himself on a shelf ladder, and, pointing along, replied: "These goods are pushed back as far as they will go, then narrow shelves are put on brackets in front of the regular shelves. The Stoves and Ranges are covered with shelf boards three or four abreast, resting on trestles. We don't handle dolls—just Iron Toys, Banks and Mechanical Toys—and say! maybe they don't take! Also wooden toys and a few games."

"No big toys?" queried John. "Oh, yes; there are a few Swinging Horses and Shoo-Flies, besides the line of Doll Buggies, Express Wagons, Sleds and Velocipedes." With that the brooms were put in their regular places on hangers and the day's work was done.

The Toy Bee.

The arrival of the holiday lines of goods, in addition to the regular work, kept John moving. Before the toys came one evening was given over to putting up the extra shelving. These shelves were used from year to year, and marked when put away, so that with the whole force

at work they were soon in place. The plan followed was to hold off the display until the time actual selling would begin in earnest, which experience had shown was about two weeks before Christmas. The marking and arranging of the toys was an occasion similar to the farmer's husking bees. At 6 o'clock the store was closed for business, and every one connected with the store in any capacity was on duty.

The drivers and shipping clerk opened the boxes, the contents were then sorted out by the clerks, after which Mr. Nailor (the proprietor) would go from group to group with the bills. The goods were marked in characters for the cost and plain figures for the selling price. Fifty per cent. was the profit expected. The cost only was given by the boss, the figuring of the selling price being done by the clerks. After a few trials John found that the figuring, being repeated, became a question of memory and was easily acquired. Thus the articles marked to cost 75 cents per dozen sold for 10 cents each, $1 to $1.25 cost sold at 15 cents, $1.85 to $2 cost sold for 25 cents, $3.75 to $4 cost for 50 cents, $7.50 to $8 cost for $1, so that the price per dozen and one-twelfth dozen became quickly associated, and $2 per dozen immediately suggested 17 cents each, $4 per dozen 34 cents each, &c.

The same general arrangement being followed from year to year, the display, after goods were set up and marked, was quickly completed, and by a little after 11 airships were flying, donkeys braying and nodding their heads, while discordant roarings issued from tawney lions and tigers.

Colored Waiters Take a Hand.

Then came the crowning event of the evening, when the front door was opened and in marched a file of colored waiters bearing trays filled with sandwiches, pickles, doughnuts and hot coffee. During the disposal of this part of the evening's business numerous reminiscences of happenings during the rush of former holiday crowds were drawn upon. How a lady in the crush had cried out she was robbed of her purse containing $100; of the suspicion thus cast upon all in her vicinity; of her rejoicing and confusion when, almost fainting, and being supported on each side by a clerk, one of whom at the door raised her umbrella; out dropped the missing purse with money intact.

Street Advertising.

The day following the two-horse wagon was filled with all manner of Toys. A space was left in the center when, on a raised platform, one of the clerks, attired in mask and robes, represented Santa Claus, throwing broadcast among the crowd handbills advertising the store. A large bell was tolled as the wagon was driven through the streets. The sides of the wagon were covered with large canvas signs, brightly lettered.

A Challenge From John.

By the third week in December holiday trade was in full swing. One evening, after a good day's business, Canthook took a card from his pocket, announcing that he had sold $50 worth of Toys. After Canthook had spoken John thought a moment, during a little mental arithmetic, then said, "What do you say to a race to see who can sell the most." "I'll go you," Canthook replied. In the discussion that followed it was arranged that all the clerks were eligible, and that sales were to cover all classes of goods.

It was not long before word of the proposed contest came to the ears of the boss, who was not slow to avail himself of the emulative spirit such a contest would provoke among the clerks, scenting, as he did, an increase in the daily cash balance. Taking John aside, he complimented him for proposing the contest and before all offered a cash prize for the winner, the contest to run until balancing time of the evening before Christmas.

An Objectionable Cash System.

The cash system at this time used was not entirely satisfactory, and Mr. Nailor, being prejudiced against cash registers, was put to it to find a practical safeguard. There was no record kept of each clerk's sales, a drawer being used into which cash slips were placed with the money; but at balancing time the cash had an elusive way of getting behind the slips. The contest showed the necessity of keeping each clerk's record separate. Slips were prepared bearing each clerk's initials and one person appointed to receive the cash, make change and care for the slips.

Talking over the contest with Canthook, John told him how the idea had pleased Mr. Nailor. "There is more than one reason for it," replied Canthook. "You know Nailor has been suspicious for some time that all cash from sales has not been turned in, yet he has never been able to find the guilty party, if there is one; this contest may help to cause a return of all the cash from sales made. Notice that stout, little old man with the basket? He is Nailor's spotter. He buys articles from all of the clerks, pays cash, and then returns the goods to Nailor. The deals seem to be all right and yet the cash is short."

A Habit That Might Be Misconstrued.

This caused John to do some serious thinking. Being honest himself, the idea that any of his fellow clerks might not be had not occurred to him. He had formed a habit to save time of slipping into his change pocket small amounts, then at a convenient time turning in the cash. A chill ran over him as he thought how that action must look to the spotter. Realizing he had had a narrow escape, if, indeed, he was not now under suspicion, he said to Canthook: "I sincerely hope Mr. Nailor will find a satisfactory cash system, but I believe if a chap is a thief and handles money no system will stop him from stealing," resolving that thereafter no action of his could be misconstrued.

The Last Day of the Contest.

The last day of the contest drew to a close. The boys could see by the smile on Mr. Nailor's face that the business from whatever cause was entirely satisfactory. John and Canthook, as near as they could figure, were in the lead, so when Mr. Nailor announced that Canthook had won John was not surprised, but he was when further announcement was made that they were so close; and from the fact that Canthook was better acquainted with the customers it was decided to give each of them a prize of equal value.

Disposing of Toys Unsold.

A day or so before New Year's all the small toys were packed and sent to different children's homes and hospitals.

"Pretty clever in the firm to do this," commented John, as he and Canthook were taking stock of them before packing. "This sheet foots up $50 cost price." "Oh, yes, it is all right," replied Canthook rather disparagingly, "but it is not all sentiment. The deed is pretty well advertised, and it helps the store because the people know there are no toys carried over from one year to another."

ELECTRICAL SIDE LINES FOR CHRISTMAS.

ELECTRICAL side lines are being carried more and more extensively by Hardware merchants, and their sale is not limited to any special seasons, for the merchant who is on the alert for ways and means to push them. The merchant who now pushes Flash Lamps, Batteries and other Electric Appliances for Christmas gifts should meet with successful sales. Sets of Christmas Tree Lamps should be particularly good sellers, as they are obviously more safe and effective than any other appliance for this purpose.

An effective way to advertise and show these sets is to procure a small Christmas tree of the artificial sort and rig it up in the window with a set of Lamps in operation. One progressive merchant in New York City now has a figure of Santa Claus in a corner of his show window, and the figure holds in one hand a small toy tree illuminated in this way, while nearby is a sign naming the prices of the 8, 16 and 24 Lamp sets, and explaining that some are operated with storage batteries, while others are intended for direct electric current.

THE MARKET POLICY OF LARGE MANUFACTURING INTERESTS.

WE are in receipt of the following letter from a New England merchant in which the position taken by large manufacturing interests in regard to prices is criticised, and a reasonable reduction advocated:

In your issue of December 5 we find the following: "A marked feature of the situation is the disposition on the part of large interests, not only to work in harmony, but also to restrict production, so as to keep the market free from the menace of accumulated stocks." The Nail and Wire interests have given out the information that if the country did not take their goods at present prices the goods would not be made. We are assured that the United States Steel Corporation has been a conserving force in their lines to prevent an undue advance, and they expect to prevent an undue decline, but as conditions develop the undue decline appears to settle down to a dogged purpose to prevent any reduction whatever.

Now is this the wisest course to pursue? Wire Rods were quoted December 5, 1906, at $37 per ton. To-day they are quoted at $34 per ton. Wire Nails on the former date were selling at $40 per ton; to-day the price is being held at $41 per ton. The price of Wire Rods indicates a base of $1.85 for Nails, instead of $2.05. Woven Wire Fencing and Barb Wire are in the same boat.

These goods are largely used by our farmers, fencing almost entirely by them, and while we see references in trade reports to the sound financial condition of this class of consumers, it is a fact that the products of the New England farmer has fallen in value from 20 to 50 per cent. within the past few weeks. If mills are to be shut down or placed on short time in order that prices may be held at their present high level, it will result in restricting the purchasing power of the largest class of consumers of farm products, which will result in still lower figures for fruit, vegetables and dairy products.

How long will the financial condition of our farmers remain sound if our manufacturers force them to pay top figures for their products and at the same time reduce the purchasing power of their consumers, which will inevitably result in minimum prices for farm products. We have felt like commending the action of the United States Steel Corporation in the past, had almost reached the point where we could forgive or forget the wind and water portion of their capitalization, but their position at the present time leads us to fear that they have not risen very far above the earth after all.

"We will shut down our mills unless you pay our prices" is not a very broad position to take in view of the conditions which surround the consumers of their products. Would not a reasonable reduction in prices now strengthen their position immensely in controlling the future course of the market? An orderly retreat is always dignified, a rout is often caused by a failure to retreat at the proper time.

ROBINSON BROS. & CO.

ROBINSON BROS. & CO., Louisville, Ky., are distributing to the trade their new mail order catalogue No. 1, profusely illustrated and fully indexed, referring to an extensive line of Hardware and allied lines, including Guns, Fishing Tackle and other Sporting Goods, Cutlery, Household Supplies, Paints, Implements, Harness, &c. On December 1 the firm annexed a building adjoining their old quarters, giving them five floors and basement, with a frontage of 45 ft. on West Main street and extending back to Nelson street. In addition to this space several large warehouses are occupied. A steady gain in monthly sales has necessitated the increased facilities and improvements. This firm was incorporated in 1901 with the following officers: President, C. P. Robinson; vice-president, R. A. Robinson; second vice-president, J. Wanless; treasurer, C. P. Dawson; secretary, H. E. Pfingst.

THE SUPPLEE HARDWARE COMPANY, Philadelphia, Pa., has issued a large and attractive catalogue for 1908 referring to the well-known line of Pennsylvania Lawn Mowers which it manufactures. The book is effectively gotten up and contains in addition to price-lists, descriptions, &c., several full page plates of the different machines shown in actual colors. Other Lawn Specialties referred to include Grass Catchers, Lawn Mowers, Rakes, Lawn Trimmers, Oilers, &c.

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THE PARCELS POST QUESTION.

DEVELOPMENTS AT WASHINGTON.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., December 10, 1907.

A FEELING of anxiety with regard to the outcome of the parcels post campaign has been aroused among the opponents of legislation in the interest of the catalogue houses by the indorsement of the plans of the Post Office Department by President Roosevelt in his annual message to Congress. Careful consideration of the text of the President's utterance and of the circumstances under which the message was prepared will relieve this feeling to some extent, but the incident will, nevertheless, serve as a spur to retail merchants in all lines to redouble their efforts to prevent the passage of any of the proposed measures. In the course of his message the President said:

> I further commend to the Congress the consideration of the Postmaster-General's recommendation for an extension of the parcels post, especially on the rural routes. There are now 38,215 rural routes, serving nearly 15,000,000 people who do not have the advantages of the inhabitants of cities in obtaining their supplies. These recommendations have been drawn up to benefit the farmer and the country storekeeper; otherwise I should not favor them, for I believe that it is good policy for our Government to do everything possible to aid the small town and the country district. It is desirable that the country merchant should not be crushed out.

Careful Examination of the President's Recommendations

shows that they were put forward in good faith upon representations made to him that they would be of advantage to the small retail merchant, and the President takes occasion to declare that the Government should do everything possible to aid this deserving class of citizens and should permit nothing to be done calculated to drive them out of business. Under the circumstances it is only necessary that the President should be convinced that the retail merchants of the country do not want the proposed rural parcels post. Already this phase of the subject has been taken up by the leading trade organizations of retailers, and it is believed that within a few days the President will fully understand the situation.

The fact should be borne in mind in this connection that the President's message was prepared more than a month ago, and that the recommendation referred to was submitted by the Postmaster-General and somewhat perfunctorily adopted by the President, carefully guarded, however, by the statement that he would not favor the innovations if they did not promise to benefit the country merchant. At the time the message was written the retailers had not been heard from concerning the Post Office Department's plans, and the President was justified in assuming that none of the projects would prove injurious. Since the publication of his message, however, his attention has been drawn to the other side of the question, including the arguments published in *The Iron Age*.

Mr. DeGraw on Proposed Cheap Parcels Post.

The systematic character of the compaign for so-called postal reforms undertaken by the Post Office Department is further emphasized by the publication on the 9th instant of the annual report of Fourth Assistant Postmaster-General DeGraw, who is charged with the supervision of the rural free delivery service. Mr. DeGraw devotes a chapter of his report to the exploitation of the advantages which he says would accrue from the adoption of the proposed cheap parcels post on rural routes, in the course of which he says:

> I respectfully recommend that the delivery by rural carriers of mail matter to communities remote from post offices, as now authorized by law, be supplemented by a parcels post delivery at a special rate of postage of 5 cents for the first pound or fraction thereof, and 2 cents for each additional pound or fraction thereof for packages not exceeding in weight 11 lb., mailed at the distributing post office of any rural route for delivery to patrons of such route or of loop routes connected therewith, or at intermediate post offices supplied by such rural service, or mailed on any rural route or at any post office supplied thereby for delivery on said route, or on any other route served by the distributing post office of such route or at any post office served thereby, or for delivery at the distributing post office.

REASONS WHY.

There are reasons why a system of parcels post delivery should be extended to communities served only by rural delivery. The conditions precedent to the establishment of rural service require remoteness from other modes of communication. From the very nature of the service it is apparent that the people who receive its benefits have not access to the convenient and cheap methods of transporting packages afforded to the residents of cities by private corporations which do not undertake to deliver packages to people living miles from a railroad. The star route contractors, by whom, prior to the establishment of rural delivery, many rural residents had received mail service, through delivery at post offices situated in their respective localities, were permitted to collect and deliver packages outside the mails for private compensation. Carriers on star routes are still allowed to perform this service and also to carry passengers for hire, and in mountainous and sparsely populated sections of the country, where delivery of mails by star routes is the only service that can be economically given, these facilities are of great benefit. Like privileges of carrying express packages were at first accorded to rural carriers, but in the act of Congress making appropriations for the postal service for the fiscal year beginning July 1, 1904, which act increased the pay of carriers from $600 to $720 per annum, a proviso was inserted that thereafter rural carriers—

> shall not solicit business or receive orders of any kind for any person, firm or corporation, and shall not during their hours of employment carry any merchandise for hire; provided, that said carriers may carry merchandise for hire for and upon the request of patrons residing upon their respective routes whenever the same shall not interfere with the proper discharge of their official duties and under such regulations as the Postmaster-General may prescribe.

Believing that the merchandise carried by carriers should be restricted to unmailable matter, the regulations promulgated under authority of this law so provide. The result of this limitation of the express-carrying privilege of the carriers has been that in some localities the people, while fully appreciating the advantage of having their mail delivered close to their homes, thus relieving them of the necessity of traveling miles to a post office, still clamor for the continuance of an otherwise unnecessary star route service because of the unrestricted delivery of parcels which it affords. In general, the restriction has resulted in limiting the merchandise carried by rural carriers to packages weighing in excess of 4 lb., or otherwise unmailable. The present rate for carrying merchandise is prohibitive, and should such rate as that recommended be adopted it would be an inducement to patrons and local merchants to utilize the mails for the transportation of small packages to and from the distributing post office and their boxes.

INCREASING GOVERNMENT REVENUE.

It is significant that when the maximum pay of rural carriers was only $400, $500 and $600 per annum, and the privileges afterward withdrawn by the act of 1904 were accorded, this rate of compensation was in many instances accepted as sufficient. From this it would appear that if the carrying of packages outside the mails (with other privileges of extra-official service) yielded the carrier a sufficient income to make a $500 or $600 salary acceptable, the authorization of a parcel-delivery service inside the mails on rural routes would turn some part at least of the proceeds formerly derived by rural carriers from express service into the postal coffers of the United States, thus yielding revenue to the Government to offset in part the additional outlay incurred by raising the maximum annual pay of rural carriers from $720 to $900. At the same time it would undoubtedly be a great convenience to the patrons of rural delivery, and facilitate materially the delivery of goods by country merchants.

Conducted under proper restrictions, such a service could be established without overtaxing the carrying capacity of the rural carriers, their horses or vehicles. They would be asked to do no more for the Government than they formerly did for their own benefit prior to the increase in their salary.

Revenue the Only Consideration.

It is manifest that Mr. DeGraw is much more concerned with regard to increasing the revenues of rural routes than in aiding the country merchant to extend his trade. It is a well-known fact that the average revenue of a route costing $900 per annum is less than one-fourth that sum, and, as the taxpayers at large who do not receive the rural service will next year be called upon to pay a deficit on that account amounting to $27,000,000, it is only natural that the Fourth Assistant Postmaster General should seek to increase the revenue by any device

that promises to help in that direction. It is an interesting fact that Mr. DeGraw, whose experience has taught him more about the rural service than any one in the department, does not make any claims for the advantages that would accrue to local merchants from the proposed innovation. He knows what the rural service has already done for the advantage of the catalogue houses, and he realizes that the proposed cheap parcel post would do even more for these big concerns, but he regards the problem merely as one of revenue and makes his recommendations accordingly.

Representative Henry's Bill.

The first gun in the parcel post campaign in Congress has been fired by Representative Henry of Connecticut, the author of the original parcel post bill. Taking advantage of the Postmaster-General's recommendation for the further utilization of the rural service for the handling of merchandise, he has introduced a bill, H. R. 255, "to secure the use of the United States rural mail equipment and to place the rural service on a paying basis." This bill provides as follows:

Be it enacted, &c., That within the limits of the respective rural routes served by post wagons parcels of mail matter shall be collected and delivered house to house by the carriers in weight up to 200 lb. and in dimensions up to a barrel; no parcel, however, to be more than 6 ft. in length.

That the rates on parcels thus collected and delivered on the rural routes served by post wagons shall be as follows: Parcels up to 8 oz., 1 cent; parcels over 8 oz. to 1 lb., 2 cents; parcels over 1 lb. to 11 lb., 5 cents; parcels over 11 lb. to 30 lb. (half bushel), 10 cents; parcels over 30 lb. to 60 lb. (bushel), 15 cents; parcels over 60 lb. to 100 lb. (half barrel), 20 cents; parcels over 100 to 200 lb. (barrel), 25 cents.

While the obove measure is a most radical proposition it cannot be contended that it is not exactly in line with the tendency of the recommendations of the Post Office Department. If the rural service is to be charged with the transportation of freight there would seem to be no reason for placing lower limits than those proposed by Mr. Henry. His action in introducing this bill at this time is certainly most opportune, for it will at least have the effect of arousing the retail merchants of the country to a realizing sense of the true character of the legislation which Congress is being asked to enact.

CHICAGO ASSOCIATION OF COMMERCE ON PARCELS POST.

By a practically unanimous vote the Ways and Means Committee of the Chicago Association of Commerce has expressed its unqualified disapproval of the parcels post scheme as proposed by Postmaster-General Meyer. This question has been under consideration by the association since the Postmaster-General in his recent speech delivered at Chicago strongly advocated the extension of the parcels post system, and outlined the plan under which it should be effected. The objections of the committee are centered upon the fact that it would create an enormous deficit in the postal budget. In addition, it is pointed out that the plan savors strongly of class legislation, in that it would discriminate between different classes of citizens. The report also sets forth that of its 2500 active members, and 40,000 associate members, embracing country merchants, practically all have expressed themselves as opposing this measure, which, it is claimed, is favored chiefly by Government officials. The resolution as adopted by the association is as follows:

Resolved, That the report of the Trade Extension Committee be adopted as the sense of this association in the matter of the extension of a parcels post, and that the matter be referred back to the Trade Extension Committee with power to oppose this measure as in their discretion they may see fit.

ACTION OF THE FORT SMITH COMMERCIAL CLUB.

At a meeting of the Commercial Club of Fort Smith, Ark., Paul B. Bigger, secretary, held on the 27th ult., the following resolutions of protest against legislation in the interest of a parcels post were unanimously adopted:

Whereas, The parcels post will again be presented at the coming session of Congress, supported this time by the head of the Post Office Department; and

Whereas, We believe the measure is premature, uncalled for except by selfish interests; therefore be it

Resolved, By the Commercial Club of Fort Smith, Ark., that we express our unalterable opposition to and disapproval of the Parcels Post bill, as advocated by the Post Office Department, and in fact to any and all parcels post bills of any kind or character, so long as the Post Office Department shows a deficit.

In support of these resolutions the following reasons are cited:

The great army of retail merchants of the country, whose prosperity is the prosperity of all the people, have no special interest in the welfare of the express companies, but they believe, with the utmost sincerity, that an express business is not the proper function of the postal system, which is not organized for that character of transportation.

Such a Government enterprise would involve the organization of an entire new division of the postal service, the providing of large and extensive warehouses in all cities of the country, the ownership and use of vast dray and wagon systems, and, most important of all, an entirely new system of transmission, unless parcels post matter is carried with first-class letter mail on fast trains at enormous cost.

The Government's loss on a domestic parcels post would come out of the pockets of the taxpayers at large, and thus the many would be burdened for the enrichment of the few, for the real beneficiaries of such a system would be a handful of mail order establishments, which are now said to handle a business of more than $150,000,000 a year in one city alone. It is estimated that two of these mail order houses would save $50,000 per annum in the distribution of their catalogues alone should any one of the pending parcels post bills become a law.

With a postal deficit which promises to reach $15,000,000 during the present fiscal year, this would hardly seem a time for advocating a parcels post. Because of its great centralizing influence the domestic parcels post is opposed by the people of the country, and especially by the retail merchants of all sections. It would build up the business of the gigantic mail order houses at the expense of the small merchant, and array the Government against the man of moderate means, discourage him from going into business for himself.

It means that the retailer and his clerks must look for some other way to earn a living, and the jobber and his traveling men must go out of business. It has been universally conceded that there is no country so sure of peace and plenty as one that is filled with small towns and cities. If the question of a large postal deficit is not to be considered, let Congress give the people an advantage to be enjoyed by all—namely, a penny postage.

CORRESPONDENCE.

Loss-Producing Activities of the P. O. Department Should be Curtailed Rather than Extended.

To the Editor: Every business man of my acquaintance who has become familiar with the details of the Post Office Department realizes more and more the unwisdom of extending its loss-producing activities. We must admit it was established for the benefit of all the people, and each user of this service should pay his proportion of the cost of the service rendered, or it should be free to the individual users and made a charge upon the general treasury like as army or navy.

You are probably aware that the business interests of the country contribute approximately 90 per cent. of the revenue from letter mail, and this contribution is about four-fifths of the entire postal revenue and is only one-seventh of the tonnage.

The Government monopolizes the carriage and distribution of this one class of mail matter and charges the people a rate which represents a profit of 375 per cent.

The enormous profit on letter mail is absorbed in the losses attending the other classes of matter.

The tendency of this sort of legislation is to centralize certain kinds of business, the product of which is delivered by the Government to remote points at rates far below a proper charge for the distance the merchandise is carried.

Hon. J. Henniker Heaton, a member of the British Parliament, and a leading authority on postal affairs in Great Britain, in a recent article on a parcels post in this country, said: "As the railway mileage of the United States exceeds that of all Europe it is plain that an American parcels post should be based on the 'zone' system." He adds: "In this way the danger which, I understand, is apprehended to small local industries would be done away with."

Germany has, I am informed, six zones, and the rate on parcels increases successively through them from the office of dispatch.

The United States Postal Guide for 1907, issued under the authority of the Postmaster-General, page 852, paragraph 566, relating to the duties of rural carriers, provides as follows:

> That said carriers shall not solicit business or receive orders of any kind from any person, firm or corporation, &c.; provided, that said carriers may carry merchandise for hire for and upon the request of patrons residing upon their respective routes whenever the same shall not interfere with the discharge of their official duties, and under such regulations as the Postmaster-General may prescribe.

There are a few other restrictions; for instance, the compensation for this service must be paid by the patron and the carrier is not permitted to receive any compensation from the seller of such merchandise. They are not permitted to carry spirituous liquors, either for themselves or for the accommodation of their patrons.

You will observe the Postmaster-General is now authorized to make such regulations as may be necessary to give rural patrons all the advantages of the so-called rural parcels post. Evidently there is little or no demand for this character of service, and the fact is the Department has been obliged to discontinue many rural routes and decline to establish new ones, owing to the indifference of the patrons and their unwillingness to provide proper receptacles for the mail and to keep the roads in satisfactory condition. The Fourth Assistant Postmaster-General, in his report just submitted, says: "The difficulty which the department has experienced in securing the improvement of highways on which rural delivery is established lies in the apathy of patrons."

Therefore, it appears the Government has established this service faster than the people are prepared for it. Now it is proposed to establish on these rural routes a parcels post, which if it serves a purpose will increase the load of the rural carriers at a time when the present apathy of its patrons is a detriment to the service.

If the Postmaster-General is correctly reported, he favors a parcels post coextensive with the United States and its possessions, and its application to the rural routes is the entering wedge.

He appears to favor the English system and substantially the same weight and rate. Several authorities maintain the English parcels post is conducted at a loss. Admit, however, that it is not, is there a possible chance that it will pay in the United States, with an area of 3,000,000 square miles as against 121,000 square miles in Great Britain, with one postoffice to every 5½ square miles in England, to one postoffice to every 50 square miles in the United States? England obtains the services of two and a half letter carriers for the price we pay one.

These are some of the reasons the rural free delivery is so costly. The Fourth Assistant Postmaster-General estimates for the current year over 39,000 rural routes. The annual cost of maintaining the average rural route is approximately $850, and the average income $130, so the rural delivery service will cost upward of $28,000,000 more than it produces.

I do not advocate withdrawing this service from our fellow citizens in the isolated sections of our country; it has been established and should be let alone until its earning power more nearly approaches the cost of maintenance, especially so since the patron of the route may if he desires now do his "shopping" through the rural carrier.

As a business question, have we not gone far enough in the extension of the loss producing activities of the Postoffice Department, and are not the business interests entitled to a reduction in letter postage to at least 1 cent for each ounce? This suggestion might impress you as reducing by one-half the income from letter postage, but experience shows this is not the case.

Letter postage has been reduced several times within the past 35 years, from 5 cents for each ½ oz. down to 2 cents for each ounce, and each reduction so increased the volume of letter mail that soon thereafter the income was greater than before the reduction was made. Many business men in large cities hire messengers to deliver local statements of accounts, reports, &c., because they can do so at a less cost than 2 cents each.

If we had a 1-cent local letter rate it would greatly increase the postal revenue. Bear in mind, these changes would not involve a loss on the business handled, but on the other hand would afford the Government a net profit on letter mail many fold greater than that exacted by any combination in the United States.

If the advocates of a parcels post favored the "zone" system and proposed a rate that covered the cost of the service based upon the same principle as passenger and freight rates, it would be a very different proposition. But, strange to say, many of them are like the leading representative of the Postal Progress League, who maintains that the railroads can transport freight and passengers 1000 miles as cheaply as 10 miles or 100 miles, and therefore a fixed charge should be made for a journey regardless of the distance traveled, and it is the application of this sort of logic (if it can be so dignified) that enables these gentlemen to see a profit to the Government in transporting and delivering an 11-lb. package for 25 cents from anywhere to anywhere throughout the United States and its possessions.

I have endeavored to give a few reasons why in my opinion the Government should move cautiously in this direction. I believe the Government in its services to the people should recognize the same principle it has forced the transportation lines to adopt, avoiding discrimination and favoritism. It appears to me this is a fundamental principle, and if not recognized then the service should be rendered without a direct charge upon the user, but made a general charge upon the treasury of the nation.

A. T. ANDERSON,
Secretary-Treasurer,
National Supply & Machinery Dealers' Association.
CLEVELAND, December 5, 1907.

A GREAT HARDWARE ENCYCLOPEDIA.

THE SIMMONS HARDWARE COMPANY, St. Louis, Mo., has just issued its complete catalogue, which has appropriately been styled "Simmons' Hardware Encyclopedia." This formidable volume contains, exclusive of inserts, 4200 pages, with over 21,000 illustrations, and covers over 79,000 items. The book is clearly and conveniently indexed and is divided into the following departments: Tools and Farming Implements, Miscellaneous Hardware, Builders' Hardware, Harness and Strap Goods, Stoves, Tinware, &c.; Cutlery, Shears, &c.; Guns, Fishing Tackle and General Sporting Goods; Bicycles and Bicycle Sundries; Sewing Machines; Baby Carriages, Refrigerators and Freezers; Baskets, Reed Furniture, Brass and Iron Beds; Lamps and Clocks, Cut Glass and Silver Plated Ware. Another department refers to what are termed mail order goods, including numerous lines, machines, &c., which a merchant might require for his own use or order for his customer, but would not be likely to carry in stock. Other valuable matter incorporated in the catalogue refers to advertising helps and supplies, electrotypes, &c., advertisement forms, window displays and suggested retail selling prices on Keen Kutter goods.

From the statistics given above it might be gathered that the size of this publication is its salient characteristic, but such is not the case. Huge and substantial as it is, the book is even more remarkable for its exhaustive treatment of the many and varied lines with which it deals. It contains not merely general information, but minute and specific descriptions touching upon practically every detail concerning which a retail merchant or his customer could make inquiry. In fact, it amply merits the title of encyclopedia, which has been claimed for it, and can only command the unstinted admiration of the entire trade. It would be regarded with nothing less than wonder by any who were unfamiliar with the development of Hardware cataloguing within recent years.

C. P. Bigley has disposed of his Hardware business at Liberty Center, Ohio, to W. N. Ferguson. Mr. Bigley has removed to Maumee, Ohio, where he has bought out the business conducted by Geo. H. Blaker for more than 50 years. Mr. Bigley's stock will include Hardware, Stoves, Paints and Oils, Tinware, &c.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

KNAPP ELECTRIC & NOVELTY COMPANY, 511-513 West Fifty-first street, New York: Catalogue No. 18 referring to Kenko Electric Specialties, Models in Miniature, &c.

CORTLAND WAGON COMPANY, Cortland, N. Y.: Illustrated catalogue of Carriages for 1908, with net price-list No. 55.

L. H. MACE & Co., 111-117 East Houston street, New York: Annual illustrated catalogue and price-list of Refrigerators for 1908. Also folder devoted to three styles of Water Coolers.

OLTMANNS & SCHMIDT, Peoria, Ill.: Illustrated booklet referring to Champion Rod Gear Roller Awning Fixtures.

AMERICAN BOX STRAP COMPANY, 501 West Broadway, New York: Illustrated catalogue and price-list of Duplex and other brands of Wire Box Straps, Corner Irons, Seals, &c.

NORTHERN MALLEABLE IRON COMPANY, St. Paul, Minn.: Illustrated catalogue of Stake Irons, Clevises, Clevis Material and Railroad and Agricultural Castings.

J. L. OSGOOD, Buffalo, N. Y.: Illustrated price-list circulars of Osgood's Patent Indestructible File and Tool Handles.

W. J. CLARK COMPANY, Salem, Ohio: Large illustrated circular referring to Steel Lockers, Cabinets, Shelving, Racks, &c.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM ANGELL & NIXON, who are engaging in the Hardware, Stove and Implement business at Portis, Kan.

FROM STANNUS-KELLER HARDWARE COMPANY, Colville, Wash., which has purchased the Shelf and Heavy Hardware, Stove, Paint and Sporting Goods business of Colville Hardware Company.

FROM EASTSIDE HARDWARE & TOOL COMPANY, Oakland, Cal., A. N. Lewis, president: F. B. Ladd, vice-president and manager, and C. L. Lewis, secretary-treasurer. This company has bought the business of P. H. Auseon and will carry a liberal stock of general and Builders' Hardware and Machine Shop and Contractors' Supplies.

THE NATIONAL NOVELTY CORPORATION has transferred all its property, business and good will to the Hardware & Woodenware Mfg. Company, a New York State corporation capitalized at $3,750,000. The new company will assume and carry out all existing obligations and collect all outstanding accounts and bills receivable of the National Novelty Corporation. The headquarters will continue at 826 and 828 Broadway, New York, as heretofore. The officers of the new company are N. H. Colwell, president; A. A. Tisdale, vice-president; F. W. Crandall, treasurer, and Edward S. Coe, secretary.

E. L. SCOTT & Co., Hardware and Farm Implements, Oakesdale, Wash., will establish a branch at St. Maries, Idaho, the building for which is now being erected. The stock will consist of Heavy and Shelf Hardware and the store will be open for business after the first of the year. A department of tinning and plumbing will also be added. O. E. Hailey, a member of the firm of E. L. Scott & Co., will be in charge of the St. Maries branch.

PENNSYLVANIA RETAIL ASSOCIATION.

AT a meeting of the Executive Committee of the Pennsylvania Retail Hardware Association J. E. Digby, McKees Rocks, secretary, held at Altoona on the 3d inst., it was decided to hold the next annual meeting of the organization at Altoona on February 24, 25 and 26. The Logan House will be headquarters for the association and there the meeting will be held. A hall large and commodious has been engaged for the installation of Hardware exhibits by manufacturers and jobbers. W. H. Goodfellow of W. H. Goodfellow's Sons, Hollidaysburg, is chairman of the Committee on Arrangements and Exhibits, and will be pleased to respond to any inquiries from concerns desirous of securing space for displays.

MISCELLANEOUS NOTES.

Babbitt Metals.

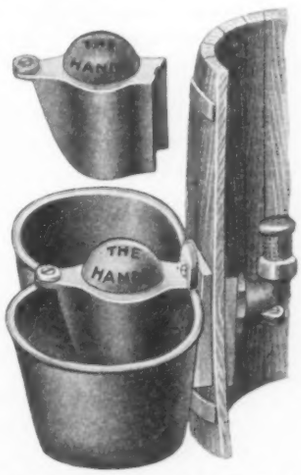
The Milwaukee Tack Company, Milwaukee, Wis., manufacturer of tacks and small wire nails of all descriptions, has recently made an addition to its plant for the manufacture of Babbitt metals. The company is now offering the standard grades, Nos. 1, 2, 3 and 4, together with genuine Babbitt metals, and is making a specialty of its own brand of Misco antifriction metal.

Sun Mfg. Company.

The Sun Mfg. Company, Columbus, Ohio, has recently added to its line a plate glass showcase with upper and lower deck, resting on a 10-in. white marble base; also a cigar case with wood work of solid white oak, polished golden oak, hand rubbed and polished. This is provided with a slatted rack and a moistening pan, with glass fronts and ends, and full length clear glass sliding doors in the rear. It is set on metal legs of copper, oxidized with corners of the same material. The company has added new lengths to its lines of candy cases, floor cases, display counters and cashier desks.

Handy Automatic Stock Fountain.

The Novelty Iron Works, Sterling, Ill., has perfected a stock watering fountain, herewith illustrated, which besides being automatic in its action is said to be exceedingly strong and durable. The pan is of cast iron and is divided into two compartments by the cast iron case which incloses and protects the brass ball float. The latter is automatically adjusted by a thumbscrew to shut off the



Handy Automatic Stock Fountain.

water at any desired hight in the pan. The flow of water is regulated by a valve located in the connecting elbow inside the tank, to which the fountain is attached. This valve consists of a soft rubber button, which sets closely in a brass valve seat, making a water tight fit. Should the valve wear out it can be inexpensively replaced without the aid of tools by screwing on a new button. A strainer attached to the top of the elbow excludes any trash that might otherwise interfere with the operation of the valve. The fountain may be attached to a tank, barrel or pipe, and is always ready for use.

Superior Ball Bearing Washer.

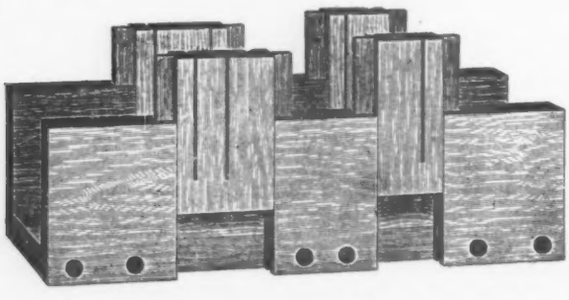
The Superior ball bearing washer made by the Superior Mfg. Company, Sterling, Ill., and herewith illustrated, is referred to as being especially strong in its construction and easily operated. The tub is made of Louisiana red cypress or white cedar, as may be preferred. It is mounted on a stand made of steel tubing, the legs of which are rigidly supported by malleable iron braces. The tub rests on three malleable iron arms, with a center pin bearing in the top of the stand. The upper end of the center pin is fitted with a cone which rests directly upon 12 steel balls forming the bearing upon which the tub revolves. Another feature designed to assist in oscillating the tub is noted in three oil tempered steel springs attached to the tub support to catch the tub at the end of

Superior Ball Bearing Washer.

travel and by recoil give it an impetus in the opposite direction. The tub is extra large, has three hoops, and is corrugated inside like a washboard. Twelve rubbing slats are fastened to the bottom, and the rubbing disk carries a corresponding number similarly arranged. This disk rests automatically on top of the clothes and does not move as the tub oscillates; it is also free from pegs that might catch and tear fabrics. A wringer attachment is provided, made of two well braced tubular steel posts. Upon the upper ends of these arms is clamped a malleable iron cross bar carrying two arms for the support of the wringer. These arms are hinged and lock automatically, thus permitting the wringer to be tilted forward and held over the tub, so that the suds and water will drip into it. It is stated that the machine is so constructed that no metal parts come in contact with the clothes.

Richards-Rose Perpetual Miter Box.

The accompanying illustration is of a miter box made of thoroughly seasoned hard maple, with saw guides which can be easily removed when worn out and replaced

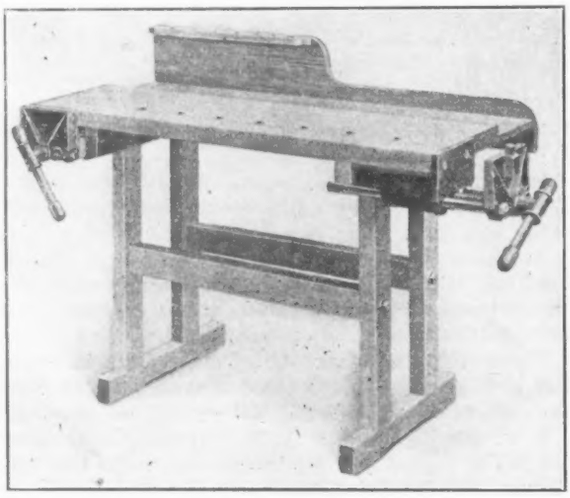


Richards-Rose Perpetual Miter Box.

with new ones, making the box as good as new at little expense. Guides can be raised to cut boards up to 8 in. wide, and special guides for wider boards are furnished on application. Extra guide boards can be purchased to replace old ones. The boxes are offered by the Richards Mfg. Company, Aurora, Ill.

Manual Training Bench.

The Wilcox Mfg. Company, Aurora, Ill., is adding to its hardware specialties a line of manual training goods. The company states that the rapid growth and development of manual training schools amply justifies special



Wilcox Manual Training Bench.

attention to their requirements in the way of equipment. The bench here illustrated is one of the features of the company's line. It is made of selected kiln dried maple, and is offered in one size only, 32 in high, 48 in. long on top and 21 in. wide. The width of the back shelf is 7 in. The bench is furnished in oil finish. It is fitted with head and tail vises of the Wilcox rapid acting pattern, or with either, as wanted, these vises being also the product of the company. The company states that the bench is very easily assembled. It is shipped knocked down and crated, the weight with one vise being 116 lb. and with two vises 146 lb.

The Ideal Micrometer Sight Adjuster.

The micrometer adjuster, for the 1901 peep sight used on the .30-40 U. S. Krag rifle, illustrated herewith, is put on the market by the Ideal Mfg. Company, New Haven, Conn. This is a vest pocket implement, shown full size, and is designed to set the sight accurately. One degree on the gauge represents a change in elevation of the shot at the target, of 1 in. for every 100 yd. shooting distance. Thus, if a man was shooting 800 yd. and he lowered the sight with the gauge 1 degree, the bullet would strike the target 8 in. lower than the previous shot. In use the micrometer

The Ideal Micrometer Sight Adjuster.

is placed between the graduated sides of the sight, with the head of the screw stem B B resting on the top of the cross bar of the sight. The latter is then raised until the knurled check nut C brings up against the cross piece at the top of the sight. After the sight cross bar is fastened with its knurled screw the gauge is removed. To set the gauge to any desired mark, such as 50 degrees, for example, the knurled check nut C is loosened and the sleeve A is turned until the beveled edge at the zero mark cuts the figure 5 on the stem B B, when it is fastened with the check nut C. To set at 55 degrees the beveled edge at zero will be half way between the figures 5 and 6 on the stem B B, &c.

The Pyko Grinder.

The Pike Mfg. Company, Pike, N. H., has added to its line of sharpening stones, &c., the grinder here shown. It is designed to serve all users of tools and cutlery, including carpenters, tinners, plumbers, butchers, farmers, chefs, barbers, housekeepers, &c. The machine measures 9 in. from the top of the grinding wheel to the bottom of the set screw, and 6½ in. wide from the end of the arbor to the outer point of the handle. The Pike corundum grinding wheel, which has a diameter of 4 in., is 1 in. wide. The machine is described as being simple, durable and easy running. There is a chain gearing which affords a steady and equal distribution of driving power, besides

The Pyko Grinder.

minimizing the chance of breakage in the castings. An improved adjustment admits of tightening the chain by setting the gear wheel farther from the wheel arbor by simply turning a set screw and adjusting the gear wheel as desired. The clamping device will fit anything up to a thickness of 2 in., and, it is claimed, will not work loose, even when a high rate of speed is maintained. The device for attaching the grinding wheel is simple, so that a new wheel can readily be adjusted at any time without necessitating the use of an extra shaft or center. The grinders are finished in green enamel and packed one each in a telescope box. The weight of one machine is 4 lb. 2 oz.; shipping weight, 75 lb. per case of one dozen.

Gardener's Friend Hand Cultivator.

The improved hand cultivator shown in the accompanying illustrations represents a tool made by the Ulrich Mfg. Company, Rock Falls, Ill., especially for garden use. It is equipped with three shovels, the center of which is

Fig. 1.—Cultivator as Used for General Cultivation.

Fig. 2.—Cultivator with Center Blade Reversed.

adjustable to several positions, or may be removed entirely if it is desired to use but two blades. By loosening the holding screw the center shovel may be turned point upward, as in Fig. 2, reversing its position as shown in Fig. 1, making a convenient tool for marking seed rows. Then, by reversing the cultivator, the two shovels can be used for covering the seeds. Fig. 4 shows the cultivator with the center blade removed and shields substituted to

Fig. 3.—Cultivator with Center Blade Removed.

Fig. 4.—Cultivator with Shield for the Protection of Small Plants.

form a protection for the cultivation of small plants. The shovels are 1¾ x 4¾ in., the outside edges being sharpened, so that weeds may be readily cut with them. The tool is provided with a handle 4½ ft. long, and weighs complete 3¾ lb. The cultivators are regularly crated in half dozen lots, the shipping weight being 45 lb. per dozen. Odd tools, however, are furnished when desired.

M. Crosswhite, Parker, Kan., has sold his Hardware store to S. A. Lathen.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	₱ gal.
Linseed, State and Western, raw	42 @43
City, Boiled	45 @46
City, Raw	44 @45
Raw, Calcutta, in bbls.	70 @..
Lard, Extra Prime, Winter	74 @77
Extra No. 1	53 @56
No. 1	49 @52
Cotton-seed, Crude, f.o.b. mill	27½@29
Summer Yellow, prime	38½@39
Summer White	@42
Yellow Winter	@45
Sperm, Crude	59 @60
Natural Winter	71 @74
Bleached Winter	74 @76
Bleached Winter, Extra	@..
Tallow, Prime	59 @60
Whale, Crude	35 @36
Natural Winter	46 @48
Bleached Winter	49 @51
Extra Bleached Winter	52 @54
Menhaden, Brown, Strained	41 @42
Light Strained	41 @42
Northern	@..
Southern	36 @..
Cocoanut, Ceylon	₱ lb 7¼@..
Cochin	₱ lb 8½@..
Cod, Domestic, Prime	42 @44
Newfoundland	44 @46
Red, Elaine	44 @46
Saponified	₱ lb 6 @ 6¼
Olive, Yellow	75 @80
Neatsfoot, Prime	55 @58
Palm, Lagos	₱ lb 6⅝@ 6¾

Mineral Oils—

	₱ gal.
Black, 29 gravity, 25@30 cold test	13 @13½
29 gravity, 15 cold test	13½@14
Summer	12½@13
Cylinder, light filtered	20½@21
Dark, filtered	18 @19
Paraffine, 903-907 sp. gravity	14½@15
903 sp. gravity	13½@14
883 sp. gravity	11 @11½
Red	13½@14

Miscellaneous—

Barytes:	
White, Foreign	₱ ton $18.50@20.50
Amer. floated	₱ ton 19.00@20.00
Off color	₱ ton 13.00@16.50
Chalk, in bulk	₱ ton 3.00@ 3.25
In bbls.	₱ 100 lb .@ .35
China Clay, Imported	₱ ton 11.00@17.50
Cobalt, Oxide	₱ 100 lb 2.50@ 2.60
Whiting, Commercial	₱ 100 lb .43@ .52
Gilders	₱ 100 lb .55@ .65
Ex. Gilders	₱ 100 lb .60@ .65

Putty, Commercial—₱ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—₱ gal.

In Oil bbls.	48 @48½
In machine bbls.	48½@49

Glue—

	₱ lb
Cabinet	12 @15
Common Bone	7½@ 9
Extra White	18 @24
Foot Stock, White	12 @14
Foot Stock, Brown	9 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	10 @12
Medium White	14 @17

Gum Shellac—

	₱ lb
Bleached, Commercial	30 @31
Bone Dry	38 @40
Button	40 @50
Diamond I	51 @52
Fine Orange	31 @35
A. C. Garnet	41 @43
G. A. L.	25 @26
Kala Button	20 @22
D. C.	54 @56
Octagon B	51 @52
T. N.	27 @29
V. S. O.	53 @55

Colors in Oil—

	₱ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @48
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	12 @16
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White Lead, Zinc, &c.—

	₱ lb
Lead, English white, in Oil	10½@10¾
Lead, American White:	
Lots of 500 lb or over, in Oil	@ 7
Lots less than 500 lb, in Oil	@ 7½
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½

Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	₱ lb
Zinc, American, dry	5⅝@ 5½
Zinc, French:	
Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10¾
Paris, Red Seal, dry	9¼
Paris, Green Seal, dry	11

Zinc, V. M. French, in Poppy Oil:

Green Seal:	
Lots of 1 ton and over	13¼@13⅝
Lots of less than 1 ton	13⅝@13⅞
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	11¾@12⅛
Lots of less than 1 ton	12⅛@12⅝

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb
Black, Carbon	6½@10
Black Drop, American	3½@ 8
Black Drop, English	8 @15
Black, Ivory	16 @20
Lamp, commercial	4 @ 6
Blue, Celestial	4 @ 6
Blue, Chinese	30 @33
Blue, Prussian	28 @32
Blue, Ultramarine	3½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	3½@ 5
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls., kegs.	@ 7¼
Litharge, bbls., ½ bbls., kegs.	@ 7¼
Ocher, American	₱ ton $8.50@16.00
American Golden	2½@ 3¼
French	1¼@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
French	11¾@12
German	10 @12
American	8¾@ 9
Red, Indian, English	4½@ 6
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 lb $0.50@1.25
English	₱ 100 lb $1.15@1.60
Sienna, Italian, Burnt and Powdered	3 @ 9
Italian, Raw, Powdered	3 @ 7
American, Raw	1½@ 2
American, Burnt and Pow'd.	1½@ 2
Talc, French	₱ ton $18.00@25.00
American	₱ ton 15.00@25.00
Terra Alba, French	₱ 100 lb .90@ 1.00
English	₱ 100 lb .80@ 1.00
American	₱ 100 lb, No. 1. .75@ .80
American	₱ 100 lb, No. 2. .60@ .65
Umber, Tkey, Bnt. & Pow.	2 @ 3¼
Turkey, Raw and Powdered	2¼@ 3¼
Burnt, American	1½@ 2
Raw, American	1½@ 2
Yellow Chrome, Pure	12 @14
Vermilion, American Lead	7 @25
Quicksilver, bulk	65 @..
Quicksilver, bags	@66
English, Imported	65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ℔ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ℔ doz. pairs .....$2.00@$3.00

Anvils—American—

Eagle Anvils.....℔ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....℔ lb 9½@9¾¢

Imported—

Peter Wright & Sons, ℔ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur.....75@80%
Jennings' Patn., Bright.65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....30%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—See *Drills, Twist.*

Expansive Bits—

Clark's Pattern, No. 1, ℔ doz. $26; No. 2, $18.....60&10%
Ford's, Clark's Pattern.....66⅔&5%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$6.50@7.00
Ames .....25&10%
Universal 20%

Ship Augers and Bits—

Ship Augers.....40&10%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....*gro.* $2.75@3.00
Unhdled, Shldered...*gro.*63@66¢
Unhandled, Patent..*gro.*66@70¢
Peg Awls:
Unhandled, Patent..*gro.* 31@34¢
Unhdled, Shldered..*gro.* 65@70¢
Scratch Awls:
Handled, Com...*gro.* $3.50@4.00
Handled, Socket..*gro.*$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—

See *Grease, Axle*

Axles—*Iron or Steel*

Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose....3¾@4¼¢
No. 1½ Com., New Style.4½@5 ¢
No. 2 Solid Collar.....4½@5 ¢
Half Patent:
Nos. 7, 8, 11 and 12..65@65&10%
Nos. 13 to 14.....65@65&10%
Nos. 15 to 18.....70@70&10%
Nos. 19 to 22.....70@70&10%

Boxes, Axle—

Common and Concord, not turned lb., 5@6¢
Common and Concord, turned. lb., 6@7¢
Half Patent.....*lb.*, 9½@10¢

Bait—Fishing—

Hendryx:
A Bait.....30%
B Bait.....25%
Competitor Bait.....20&5%

Balances—Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb.... per lb., —@2½@2¼¢

Towel

No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ℔ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....℔ doz. $1.50

Beaters, Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.50

Bellows—

Blacksmith, Standard List..
Split Leather.....60&10@65%
Grain Leather.....50@50&10%

Hand—

	6	7	8	9	10
Inch..					
Doz..	$5.00	5.50	6.00	6.50	7.50

Molders—

	10	12	14	16
Inch..				
Doz..	$7.50	9.00	12.00	15.00

Net Prices.

Bells—Cow—

Ordinary Goods..75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55&10%

Hand—

Polished, Brass.....50@50&10%
White Metal.....50@50&5%
Nickel Plated.....50%
Swiss 50%
Cone's Globe Hand Bells.....33⅓@35%

Miscellaneous—

Farm Bells.....*lb.*, 2¼@2½¢
Church and School....60@60&5%

Belting—Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard .....70&5%
Light Standard.....75%
Cut Leather Lacing.....40&10%
Leather Lacing Sides, per sq. ft. 2½@2¾¢

Rubber—

Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....70@70&5%
Extra .....60&5@60&10%
High Grade.....50&5@50&10%

Bench Stops—

See *Stops, Bench*

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 25%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden.....75%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....40%
Embossed 50%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ × 6 *and smaller*..70&5@—%
Larger and longer.....65@—%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends.....65&5@—%
Machine (Cut Thread):
⅜ × 4 *and smaller*..70&7½@—%
Larger and longer...65&5@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch	6	8	10
Per doz	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$1.00	1.40	1.65

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch	6	8	10
Per doz	$0.75	.95	1.25

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10@10%
Ives' Patent Door.....55%
Ives' Wrought Metal.....45%

Expansion—

Richards Mfg. Co.....50&10%

Plow and Stove—

Plow .....65&5@—%
Stove .....85@85&5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16,1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Bung—

Borers Bung, Ring, with Handle:

Inch.....	1¼	1½	1¾	2
Per doz....	$4.80	5.60	6.40	8.00
Inch			2¼	2½
Per doz.....			$8.65	11.50

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 45%

Braces—

Common Ball, American....$1.50
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 214 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat..60&10%

Brackets—

Wrought Steel.....70&10@75&10%
Bradley Metal Clasp..80&10@80&10&5%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Taplin Victor Handy Egg Beater Bracket .....℔ doz. $1.50

Bright Wire Goods—

See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75%

Buckets, Galvanized—

M'f'gr's list, price per gross.

Quart..	10	12	14	
Water, Reg...	25.35	28.00	32.00	10&5%
Water, Hvy...	45.35	48.00	52.00	
Fire, Rd. Btm.	32.00	34.65	38.65	
Well	37.35	41.35	45.35	

Bull Rings—See *Rings, Bull*

Butts—Brass—

Wrought, High List, Oct. 26,'06.55%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—

Bright.	
Light Narrow, Light Reversible	70&5%
Reversible and Broad	70&5%
Loose Joint, Narrow, Light Inside Blind, &c.	70%
Back Flaps, Table Chest, Japanned.	65%
Light Narrow, Loose Pin.	40&5%
Light Narrow, Ball Tip	60%
Broad	40&5%
Steeple Tipped	70%
Ball Tipped	70%

Extra 10%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list, 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze; Series 700, 800..30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's, Blunt,4@4¾¢; Sharp, 4½@5¼¢
Lautier, Blunt, 4@4¼¢; Sharp,4½@4¾¢
Perkins', Blunt, ℔ lb. 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B. ..... *52@55¢*
G. D. ..... *per M 34@35¢*
F. L. ..... *per M 40@42¢*
G. E. ..... *per M 48@50¢*
Musket ..... *per M 62@63¢*

Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:

32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Sieyd. $1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed ..... *65&10%*
Plate ..... *60&5%*
Philadelphia ..... *70&10%*
Acme, Ball Bearing..... 35%
Gem (Roller Bearing).....70&10&10&5%
Steel Gem..... 20%
Standard Ball Bearing..... 45%
Yale (Double Wheel) low list..40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

5-16	¼	5-16	⅜	7-16	½	9-16
$8.77	6.17	5.02	4.57	4.37	4.27	4.22
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.			
$4.17	4.07	4.02	4.12			

In cask lots, deduct 25¢.

German Coil:
6-0 to 1.....70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.
Halter ..... 35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$28.00
6½—6-2, Straight, with ring..$29.00
6½—8-2, Straight, with ring..$32.00
6½—10-2, Str'ght, with ring..$37.00
NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c..60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... *60&10%*
Brass *60%*
Safety and Plumbers' Chain, *60&10%*
Gal. Pump Chain....lb. 4½@4¾%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@60&5%
Wire Goods Co.:
Dog Chain..... 70%
Universal Dbl. Jointed Chain..... 50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set .8¢
Aluminoy Sash Ribbon, per 100 ft..... $1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 45%
Pullman, per gro..... $51.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....35%
Gentlemen's Chests, with Tools..25%
Farmers', Carpenters,' etc., Chests, with Tools..... 20%
Machinists' and Pipe Fitters' Chests, Empty..... 45%
Tool Cabinets..... 45%
C. E. Jennings & Co.'s Machinists Tool Chests..... 7½%

Chisels—

Socket Framing and Firmer

Standard List.....75&10@—%
Buck Bros..... 30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's ..... 66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros..... 30%
C. E. Jennings & Co. Nos. 191. 181..25%
L. & I. J. White Co..... 25&5%

Cold— lb.

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks..... 35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00..... 35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks..... 35%
Pratt's Positive Drive..... 25%
Skinner Patent Chucks:
Independent Lathe Chucks..... 35%
Universal, Reversible Jaws..... 35%
Combination, Reversible Jaws.....35%
Drill Chucks, New Model, 25%; Standard, 45%; Skinner Pat., 25%; Positive Drive..... 10%
Planer Chucks..... 20%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104..... 35%
Union Czar Drill..... 25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill..... 50%
Scroll Combination Lathe..... 50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co. ..... 50&10%
Resly, Parallel..... 33⅓&10%
Myers' Hay Rack..... 45%
Lineman's Swedish Neverturn.....65%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel, ℔ doz. $4.05 net
Star Shank, All Steel, ℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros..... 30%
Fayette R. Plumb..... 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each..... $6.75
Stewart's Patent Sheep Shearing Machine, each..... $12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 25 & 5

Clips, Axle—

Regular Styles, list July 1, '05, 80&6&10%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c. ..... *70@—%*
Compression Bibbs..60&10@—%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list..... 40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers..... 60%
Lodi Dividers..... 70&10%

Conductor Pipe,—

L. C. L. to Dealers:

Galvanized			
Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*	
Eastern:			
70%	*50&17½%*	*45%*	
Central:			
70&5%	*55%*	*45%*	
Western and Southern:			
65&10%	*50&2½%*	*40&5%*	
So. Western			
65&5%	*45&5%*	*40&2½%*	

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled..... 10%
Agato Lined..... 10%

Coopers' Tools—

See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 2¼@2¢; lighter than 3 lb. to pair.....26@29¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 23¢; No. 7, 23½¢; No. 6, 24½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted.18@20¢
Patent Russia.....lb...20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted..lb.13@14¢
Patent India, Twisted...lb...17¢
Pearl Braided, cotton, No. 6, ℔ lb. 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10..... ℔ lb 25 ¢
Pullman:
Wire Sash Cord..... 10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 65¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....℔ lb 40¢
Massachusetts, Drab.....℔ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢; } 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.....90@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord ..... 85&10%

Cradles—

Grain ..... *40&12½%*

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber. ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $8.50; Black.....$4.00
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $16.25; Indelibles $18.75
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ⅛ x 3-16, $2.50; 5 x 1¼ x 3-16..... $3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $5.50; Light $5.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden..... 50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847.℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ℔ doz. $3.00
Wm. Rogers & Son..... ℔ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co..... 40%
Red Devil..... 60%
B. Mfg. Co..... 40%
Woodward 50%

Meat and Food—

American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6 25@25&7½%

No. 202, $1.50..... 40&7½%
P., S. & W. Co.:
Dixon's ..... ℔ doz. 33⅓%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal ..... 40@40&5%
Hales ..... 60&10&5%
Little Giant..... ℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$14.00	$72.00	$68.00

New Triumph No. 606, ℔ doz. $24.00, 40&10%
Russwin Food, No. 1, $24.00; No. 2, $27.00 ..... 45&10&10%
$15.00 ..... $18.00
Enterprise Beef Shavers..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters..... 35%
Corn Graters..... 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ℔ doz. $1.00

Tobacco—

All Iron, Cheap..doz. $1.25@$1.50
Enterprise ..... 25@30%
National, ℔ doz., No. 1, $21; No. 2, $18 ..... 40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ℔ doz., $24.00..... 25%
Samson, ℔ doz., $34.00..... 25%
Iwan's Imp'ved Post Hole Auger..40%
Vaughan Pattern Post Hole Augers, ℔ doz., $7.00
Perfection Post Hole Diggers, ℔ doz. $8.75
Split Handle Post Hole Diggers, ℔ doz., $7.75
Hercules Pattern, ℔ doz..... $10.00
Kohler's, ℔ doz., Universal, $15.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer..... $7.50
Never-Break Post Hole Diggers, ℔ doz., $24.00..... 60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines ..... *$1.50@$1.75*
Breast, Millers Falls..... list
Breast, P., S. & W..... 33⅓%
Goodell Automatic Drills.50&10&10&10%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis..... 25%
Ratchet, Parker's..... 40%
Ratchet, Weston's..... 40%
Ratchet, Weston's, Style H Improved 40%
Ratchet, No. 912..... 40%
Ratchet, Celebrated..... 40%
Ratchet, Whitney's, P., S. & W., 50&5%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00..... 33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank..... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2½-in., $6; 4-in., $7.50; 6-in. ℔ 50%
Buck Bros.' Screw Driver Bits..... 30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet..... 35%
Goodell's Auto..... 65@65&10%
Mayhew's Black Handle..... 40%
Mayhew's Monarch..... 40%
Millers Falls, Nos. 20 and 21..... 25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized*	
Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:		
75&5%	*60&10%*	*45%*
Central:		
75&10%	*65%*	*45%*
Western and Southern:		
75%	*60&5%*	*40&5%*
So. Western:		
70&10%	*55&7½%*	*42½%*

Terms.—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows

Elbows and Shoes—

Factory shipments, all territories:

	Galv. Steel and Galv. C. I. Standard Gauge
No. 26	*80%*
No. 24	*50%*
No. 22	*25%*
Copper	*10%*
	60&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue..... 40&10&10%
Reeves, Dover, one piece..... 40&10%

Emery, Turkish—

	4 to 16:	*5½ to 220:*	*Flour.*
Kegs ..... *lb.*	*5* ¢	*5½* ¢	*3½* ¢
½ Kegs.....lb.	*5½* ¢	*5¾* ¢	*3¾* ¢
¼ Kegs.....lb.	*5½* ¢	*6* ¢	*4* ¢
10-lb. cans, 10 in case....	*6½* ¢	*7* ¢	*6* ¢
10-lb. cans, less than 10.....	*10* ¢	*10* ¢	*8* ¢
Less quantity..	*10* ¢	*10* ¢	*8* ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's .....50&10%
Walling's .....40&10%
Upson's Patent.....40%

Cord and Weight—
Ives and Titan.....33⅓%

Faucets—
Cork Lined.....50&10@60%
Metallic Key, Leather Lined..60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....40%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined...50%
John Sommer's Reliable Cork Lined..50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, ⅓ doz. $36.00.....40&10%
Lane's, ⅓ doz. $36.00.....40&10%
National Measuring, ⅓ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade...75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33 1-3@40%

Fixtures, Fire Door—
Allith Underwriters' Approved.....50%
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

P., S. & W. Co.....25%
Reading Hardware Co.....60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....40&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&10%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....60&10%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
} *10&2½%*

Gates, Molasses and Oil—
Stebbins' Pattern.....75@80%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..67½%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.20
Spike, Metal, No. 1, $1.00; 2, $1.20
Nail, Wood Handled, No. 1, $2.20; 2, $2.60
Spike, Wood Handled, No. 1, $1.20; 2, $1.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush..25&10@50%
Elwell's 40%

Grease, Axle—
Common Grade....gro. $6.00@6.50
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ⅓ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50.....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ⅓ inch, ⅓ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....60&5@60&10%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@60%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'...55&10@55&10&5%
Heller's Farriers'.....40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel.....50%
Farriers' .....40&10&5%
Riveting 50%
Machinists', revised list.....66⅔&5%
Blacksmiths' .....50&5%
Fayette R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand.50&10&5@60&5%
Machinists' Hammers.....60@60&10%
Rivet and Tinners'.40&7½@40&12½&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢..80&5@—%
3 to 5 lb., per lb., 40¢..80&5@—%
Over 5 lb., per lb., 30¢.....80&10&5@—%
Wilkinson's Smiths'...lb. 9¼@10¢

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $3.00@$3.50
Brad Awl.....gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@$1.95; Hickory....$1.60@$1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle... ⅓ gro. $0.85@$1.50
W. A. Zelnicker Supply Co.:
Hammer, ⅓ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.90.
Sledge, ⅓ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ⅓ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ⅓ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ⅓ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ⅓ doz., 12 to 14 in., $2.00.
} *50%*

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, Nos. 1 and 2; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&2½%
Roller Bearing.....70&2½%
Griffin Mfg. Co.:
Solid Axle, No. 19, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Lawrence Bros.:
Advance .....55&10%
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2.70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 44..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Myers' Stayon Hangers.....60%

} *Extra 10% often given.*

Hangers— Garment—
Pullman Trouser, ⅓ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro.....$10.50
Victor Folding.....⅓ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ⅓ doz. net $4.50

Joist and Timber—
Lane Bros. Co.....30%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ⅓ doz..60%

Hatchets—
Regular list, first qual. 40&2½@—
Second quality.....50&5@—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....25%
Clark Coal, ⅓ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: (Victor; National: 1868 O. P.; Niagara: Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ⅓ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65 55 .....75&5%
Niagara, Gravity Locking, Nos. 1 3 & 5.....75&5%
Tip Pat'n, No. 1.....75&10%
No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—

Clark's or Shepard's—Doz. sets: *No.*	*1*	*2*	*3*
Hinges with L't'chs.	*$3.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....doz. ...@$2.00
Without Latch...doz. ...@$1.60
Reversible Self-Closing:
With Latch.....doz. ...@$1.75
Without Latch...doz. ...@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville Hardware Co.: Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Pivot Hinges—
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....50%

Spring Hinges—
Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, Cast Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor..40%
Bommer Spring Hinges.....40%
No. 959 Wrot, Steel Hold Back, ⅓ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor..50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ⅓ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ⅓ gr. $12.00
Columbian Hinges.....60&10%
Gem, new list.....30%
Clover Leaf.....⅓ gr. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....⅓ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ⅓ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%

} *Extra 10% often given on most of these Hinges.*

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges..50&10%
Heavy Strap Hinges..60&5%
Light T Hinges.....50%
Heavy T Hinges.....40%
Extra Hvy. T Hinges.50&10%
Hinge Hasps.....33⅓%
Cor. Heavy Strap...60&5%
Cor. Ex. Heavy T...50&10%
} *Extra 10&7½%.*

Screw Hook and Strap.
6 to 12 in. ..lb. 3½¢
14 to 20 in. ..lb. 3½¢
22 to 36 in. ..lb. 3½¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch .....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross.

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*43*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

} *10&5%*

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern..... 60&10@60&10&10%
Grub, list Feb. 23, 1900 70&10&10&75&10%

D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 40&5%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz., 60&10%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.40
B. B., 6½ in.....$3.50
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱ doz. $5.25

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....25%
Empire.....50%
Pullman.....35%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz. pairs. $1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt.....80%
Wire C. & H. Hooks....75@—%
Bradley Metal Clasp Wire, Coat and Hat, 70&10%; Ceiling.....70&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Wire Goods Co.: Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz.$3.00
Grass, common grades, all sizes, per doz......*$1.50*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Coverdale Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....*ft. 5@ 6¢*
3 ply Guaranteed.....*ft. 8@ 9¢*
4 ply Guaranteed.....*ft. 10@11¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8@ 9¢*
Fair Quality.....*ft. 10@11¢*

Irons— Sad—

From ¼ to 10.....*lb. 3@3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Tops	83	80	93	91
Tin'd Tops	88	85	98	95

New England Pressing..lb.3¾@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Pinking—

Pinking Irons.....*doz.60¢*

Irons, Soldering
See *Copiers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Kettles—

Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Wilmington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....*75&5@75&10%*
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz.$5.50@5.75
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Miscellaneous—

Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—

Base, 2½ inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40&10%
Reading.....60%

Lanterns—Tubular—

Regular, No. 0.....*doz.$4.35@4.50*
Side Lift, No. 0.....*doz.$4.60@4.75*
Hinge Globe, No. 0.doz.$4.60@4.75
Other Styles.....*40@40&10%*

Bull's Eye Police—

3-inch.....*$4.25@4.50*

Latches— Thumb—

Roggin's Latches, with screw..*doz. 35@40¢*

Door—

Allith Mfg. Co., Reliable and Alligator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.90
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—
See *Pumps—*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.50*	*2.25*	*2.00*
75 feet	*$2.10*	*1.80*	*1.65*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines White Cotton.....20%
Shade Cord, Cotton or Linen....20%

Locks— Cabinet—

Cabinet Locks.....*33⅓%*

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55&5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40&20%; Robinson Pat. Ventilating Sash Lock, 33⅓%.
Pullman Patent Ventilating Lock..35%
Reading Sash Locks.....40%

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—

Reisinger Invincible Hand Power.... ₱ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclon. High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros, Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60%
Pennsylvania, Jr., Ball Bearing, 50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spcl. list, 70&10%
Style D, High Wheel, spcl. list..70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous.....*87½@87½&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

	Nos. 6	7	8	9	10	
Anchor	23	21	20	19	18	..40&5%
Coleman	13	12	12	11	11	..net
New Haven	23	21	20	19	18	..40&5%
Livingston	19	18	17	16	16	..10%

Western.....₱ lb. 8½¢
Jobbers' Special Brands.....*per lb.9@10¢*

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*.. 1.10*	*1.10*	*1.10*		*.. gro*

Nippers—
See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Square, Blank or Tapped.4.80¢
Hexagon, Blank or Tapped.5.10¢
Square, B'k, C., T. & R...5.10¢
Hexagon, B'k, C., T. & R.5.70¢
Hot Pressed:
Square, Blank.....*5.30¢*
Hexagon, Blank.....*5.70¢*
Square, Tapped.....*5.30¢*
Hexagon, Tapped.....*5.60¢*

Oakum—

Best.....*lb.. 6¼¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum..2¾@3¢

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....*75%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Zinc.....*65&10%*
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*

Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....*$1.75@$3.00*
Yankee Can and Bottle Opener, ₱ doz., net, $0.75; Little Gem, ₱ doz., net.....$0.65

Egg—

Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—

(Fair quality goods.)

Sheet, C. I.....*11@12¢*
Sheet, C. O. S.....*11@12¢*
Sheet, C. B. S.....*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₱ lb. 80¢.....25%

Miscellaneous—

American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—

Standard List.....*65&7½@70%*
Edwards, Royal Blue.....65&7½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: *lb.*
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.3½to5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....*3@5¢*
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll .....*$@58¢*
Medium weight, 30 lbs. to roll .....*56@70¢*
Heavy weight, 40 lbs. to roll..... *75@78¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$54.50*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—

1 ply (roll 400 sq. ft.), ton..... *$34.00@$38.00*
2 ply, roll 108 sq. ft.....*65¢*
3 ply, roll 108 sq. ft.....*88¢*
Slater's Felt (roll 500 sq. ft.).*80¢*

Sand and Emery—

Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....*25%*
Emery Paper and Cl'h..50&10@60%

Parers— Apple—

Goodell Co.:
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
New Lightning.....₱ doz. $7.00
Turn Table '98.....₱ doz. $6.00
White Mountain.....₱ doz. $3.00
Bonanza Improved.....each $7.50
Dandy.....each $10.00
Eureka Improved.....each $20.00
New Century.....each $20.00
Ranger.....each $25.00
Livingston Nail Co.:
Daisy.....₱ doz. $1.00
Little Star.....₱ doz. $3.00
Rocking Table.....₱ doz. $6.20
Reading Hardware Co.:
Advance.....₱ doz. $1.00
Baldwin.....₱ doz. $1.00
Reading 72.....₱ doz. $3.25
Reading 78.....₱ doz. $6.25

Potato—

Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $6.00

Picks and Mattocks—

List, Feb. 23, 1899.70&10@70&10&5%
Cronk's Handled Garden Mattock, ₱ doz., No. 2, $2.60; No. 3, $2.40.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in.....60&10&1—%
Extra Heavy, 2-6 in..70&10&1—%
Fittings, Standard and Heavy, 75&10@—%

Pipe, Merchant—

	Consumers, Carloads. *Steel.* Blk.	Galv.	*Iron.* Blk.	Galv.
	%	%	%	%
⅛ & ¼ *in*...	64	48	57	41
⅜ *in*.....	66	52	59	41
½ *in*.....	68	56	61	49
¾ *to 6 in*....	72	62	66	56
7 to 12 in....	69	54	61	46

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 82%
Second-class 85%

Pipe, Stove—

Per 100 joints.	C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	$6.15	$7.15
6 in., Uniform Color	6.65	7.65
7 in., Uniform Color	7.65	8.65

Planes and Plane Irons—

Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Sapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes
Chaplin's Iron Planes.....50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....⅌ doz. $8.00

Plates—
Felloe .....lb. 4@4¼¢

Pliers and Nippers
Button Pliers....75&5@75&10&5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50&5%
Crouk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 35%; Elm City, 35%; Paragon, 50%; Lodi, 55%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers...*lb.* 9¼¢
¼-lb. papers.....*lb.* 10 ¢
¼-lb. papers.....*lb.* 10½¢

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Prestoline Liquid, No. 1 (¼ pt.) ⅌ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ⅌ doz. 50¢; ⅌ gro. $4.50; ½ lb boxes, ⅌ doz. $1.25; 1 lb boxes, ⅌ doz. $2.25.
U. S. Liquid, 8 oz. cans, ⅌ doz., $1.25.
Barkeepers' Friend Metal Polish, ⅌ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ⅌ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ⅌ doz. 75¢
Black Jack Paste, ⅝ lb cans, ⅌ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ⅌ gr. $5.75.....10%
Dixon's Plumbago.....⅌ lb 8¢
Fireside .....⅌ gr. $2.50
Gem, ⅌ gr. $1.50.....10%
Japanese .....⅌ gr. $3.50
Jet Black.....⅌ gr. $3.50
Peerless Iron Enamel, 10 oz. cans, ⅌ doz. $1.50

Poppers, Corn—
1 qt. Square..*doz.$0.88; gro.$8.75*
1 qt. Round..*doz.$1.00; gro.$10.00*
1½ qt. Square..*doz.$1.10; gro.$11.00*
2 qt. Square..*doz.$1.35; gro.$13.50*

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....35&10%
Tinned .....30&10%

Powder—
In Canisters:
Duck, 1 lb.....*each* 45¢
Fine Sporting, 1 lb....*each* 75¢
Rifle, ½-lb.....*each* 15¢
Rifle, 1-lb.....*each* 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Presses—
Fruit and Jelly—
Enterprise Mfg. Co.....20@25%

Seal Presses—
Morrill's No. 1, ⅌ doz., $20.00.....50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, ⅌ doz., $12.00..33⅓&10%
Morrill's No. 1, Nail Puller, ⅌ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davison 60%

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz....	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz...	$0.16	.19	.25	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....17@20¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....20@21¢
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle.....17@20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ⅌ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in.....20½¢
No. 26 Trov..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26..1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c....50%
Barnes Dbl. Acting (low list)....40&5%
Barnes Pitcher Spout.....75&5%
Contractors' Rubber Diaphragm No. 2 R. & L. Block Co.....$16.00
Daisy Spray Pump.....⅌ doz. $6.50
Flint & Walling's Fast Mail Hand, (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. .....75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....40&5%
Myers' Power Pumps.....40&5%
Myers' Spray Pumps.....40&5%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	2	2½	3	3½	4
	$3.10	3.70	4.35	4.95	5.60

Cup Leathers—Per 100:

Inch.....	2½	3	3½	4
	$3.80	4.75	6.20	8.80

Punches—
Saddlers' or Drive, good..... *doz.* 50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....*doz.*$3.60
Bemis & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 35%; Paragon, 50%; Lodi.....55%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co., ⅌ doz., $1.44.....40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..⅌ ft. 3¼¢
O. N. T. Rail.....$3.12
Griffin's:
xxx, ⅌ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ⅌ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ⅌ 100 ft. $3.45
O. N. T., ⅌ 100 ft., 1 in., $3.00; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....⅌ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ⅌ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, ⅌ ft., 11¢.
1 x 3-16 Track.....60&5%
Myers' Stayon Track.....55&7½%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ⅌ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Cronk's:
Steel Garden: Champion, 75%; Ideal, 80%; Victor.....80&25%
Queen City Lawn, ⅌ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ⅌ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ⅌ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....⅌ doz. $3.15
Lawn Queen, 24-tooth....⅌ doz. $3.25
Paragon, 20-tooth.....⅌ doz. $2.70
Paragon, 24-tooth.....⅌ doz. $2.75
Steel Garden, 14-tooth....⅌ doz. $2.40
Malleable Garden, 14-tooth, ⅌ doz. $2.00@2.25

Rasps, Horse—
Disston's 75%
Heller Bros.....70&5@70&10&5%
Liverlight Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard. .....60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, ⅌ doz., No. 42, $36.00; No. 44, $20.00; No. 82, Platina, $25.00. } Dis. 40%
Red Devil.....65%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum German Silv., Bronze.25%
1240 N, 124 N.....20%
3001 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 06 PN.....20%
2904 P, 33⅓%; 2904 PN, 33⅓%; 0924 N, 33⅓%; 02904 N, 33⅓%; 002904 PN, 33⅓%; 802 N, 33⅓%.
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 66⅔%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal..25%

Revolvers—
Single Action.....$5¢@$1.00
Double Action, except 44 cal..$2.00
Double Action, 44 caliber....$2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade
16 in.....*per doz.*$2.50@$2.75
17 in.....*per doz.*$2.75@$3.00
18 in.....*per doz.*$3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 *inch.*
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.10	1.25	1.65 *doz.*

Hog Rings and Ringers—
Hill's Rings, gro. boxes....$4.25
Hill's Ringers, Gray Iron, doz.60¢
Hill's Ringers, Malleable Iron.. *doz*.80¢
Blair's Rings.....*per gro.*$4
Blair's Ringers.....*per doz*.75¢
Brown's Rings.....*per gro*.$5.25
Brown's Ringers....*per doz*.75¢

Rivets and Burrs—
Copper .....40&10@50%
Carriage, Coopers', Tinners, &c.:
Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, paste board boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—
Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—
Manila, 7-16 in. diam. and larger: Pure .....lb., 11½@12¢
Sisal, 7-16 in. diam. and larger: Pure .....lb., 8¢
Sisal, 7-16 in. diam. and larger: No. 2 quality.....lb., 7@7¼¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed .....lb., 7@7¼¢
Pure .....lb., 9¼¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed .....lb., 6¼@6¾¢
Pure .....lb., 7¼¢
Cotton Rope: Best, ¼-in. and larger...18@20¢
Medium, ¼-in. and larger.16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 7½@8¢
Thread, No. 2, ¼-in. & up, lb., 7@7½¢

Wire Rope—
Galvanized .....37½&2½%
Plain .....45&2½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Urson Nut Co.:
Boxwood .....40@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames ..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth. 50%
Band, 2 to 18 in. wide 60%
Band, ¾ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws ..30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws ..30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws. 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A ..25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s'
Hack Saw Frames, Nos. 175, 180.... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades.....40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames..... 40%

Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00 .....15&10%
Rogers, complete, $3.50 and $4.00... 15&10%

Scales—

Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... doz., $5.50
Two Platforms, ½ oz. to 8 lbs. ..... doz., $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.50@2.60
Ship....Light, $2.00; Heavy, $1.50
Chapin-Stephens Co., Box...30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1¼, $3.00@3.25; 1¼ $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood...70&10@70&10&10%
Chapin-Stephens Co., Hand..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point.....75&10&10%
Coach, Gimlet Point...75&10&5%
Hand Rail..... 70&10@75%

Jack Screws—

Standard List.....70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head.....40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14..... 65&10%

Set and Cap—

Set (Iron)..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap..... 70&10&7½%
Hex. Hd. Cap..... 70&10&7½%
Rd. Hd. Cap..... 50&7½%
Fillister Hd. Cap..... 60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron.....87½&5@..%
Round Head, Iron.....85&5@..%
Flat Head, Brass.....80&5@..%
Round Head, Brass..77½&5@..%
Flat Head, Bronze....75&5@..%
Round Head, Bronze.72½&5@..%
Drive Screws.....87½&5@..%

Scroll Saws—

See *Saws, Scroll.*

Scythes— *Per doz.*

Grass, No. 1, Plain....$6.25@6.75
Clipper, Bronzed Webb..$6.50@7.00
No. 3 Clipper, Pol'd Webb.. $6.75@7.25
No. 6 Clipper and Solid Steel, $7.00@7.50
Bush, Weed and Bramble, No. 2. $6.50@7.00
Grain, No. 1.....$8.25@8.75
Bronzed Webb, No. 1..$8.50@9.00
Nos. 3 and 4 Clipper, Grain.. $8.75@9.25
Solid Steel, No. 6.....$9.25@9.75

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18..20&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel.....℔ doz sets $9.00

Sets, Nail—

Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro, $12. 40&10%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt.....40&10%
Snell's Knurled, Cup Pt.....40&10%
Victor Knurled Cup Pt....℔ gro. $7.50

Rivet—

Regular list..... 75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1..... $15.00
Nos. 3 and 4, Cross Cut....$20.60
No. 5, Mill..... $30.00
Nos. 10, 11, 95..... $15.60
No. 1 Old Style..... $10.00
Special $16.25
Giant Royal Cross Cut....℔ doz. $8.00
Royal, Hand..... ℔ doz. $4.50
Taintor Positive..... ℔ doz. $4.75

Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s..... 75%

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz..... $1.50
Mounted Kitchen Sand Stone, ℔ doz..... $1.50
Natural Grit Carving Knife Hones, ℔ doz..... $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz..... $1.50
Quick Edge Pocket Knife Hones, ℔ doz..... $2.50

Skate—

Smith & Hemenway Co., Eureka..50%

Shaves, Spoke—

Iron ..... doz. $1.10@1.25
Wood ..... doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.)..... 45%
Chapin-Stephens Co..... 30@30&10%
Goodell's, ℔ doz. $9.00..... 15&10%

Shears—

Cast Iron..	*7*	*8*	*9 in.*	
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Tailors' Shears..... 40@40&10%
Acme Cast Shears..... 40@40&5%
Heinisch's Tailor's Shears..... 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list..... 30&10&5%
Grass ..... 50&10%
Horse or Mule..... 50&10%

Tinners' Snips—

Steel Blades..... 20&5@20&10%
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin, 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6¾ to 10 in..... 33⅓&7½%
Niagara Snips..... 40%
P. S. & W. Forged Handles, 25%; W. R. W..... 10&10%

Pruning Shears—

Cronk's Hand Shears..... 33⅓%
Cronk's Wood Handle Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades..... 40%
P. S. & W. Co..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%

Sheaves— Sliding Door—

Reading 40%
R. & E. list..... 15%

Sliding Shutter—

Reading list..... 40%
R. & E. list..... 10%

Shells—Shells, Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge.....65&10%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade..... 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%
Expert, 10, 12, 16 and 20 gauge, 33⅓&5%

Shells, Loaded—

Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade..... 40&5%
Loaded with Smokeless Powder, high grade..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders..... 40%
Nitro Club, Smokeless Powders.40&5%
Arrow, Smokeless Powders.40&10&10%
Winchester:
Smokeless Repeater Grade..... 40&5%
Smokeless Leader Grade...40&10&10%
Black Powder..... 40%

Shingles, Metal— Per Sq.

Edwards Mfg. Co.:

	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in.	$4.25	$5.50
Dixie, 10 x 14 in.	4.50	6.00
Dixie, 7 x 10 in.	5.00	6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes..... ℔ keg $3.90

Shot—

25-lb. bag.
Drop, up to B..... $1.95
Drop, B and larger..... 2.20
Buck 2.20
Chilled 2.20
Dust 2.40

Shovels and Spades—

Association List, Nov. 15, 1902..40%
Avery Stamping Co..... 40%

Snow Shovels—

Long Handle.....$3.25@$3.50
Wood and Mail, D. Handle. $3.75@$4.00

Sieves and Sifters—

Hunter's Imitation..... gro. $9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ℔ doz..... $39.00

Sieves, Seamless Metallic

	—Per dozen.—			
Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in..... 60%
20 x 20 to 24 x 30 in..... 50%
24 x 60 to 24 x 120 in..... 30%
Barnes' low list:
Up to and including 20 x 36 in....50%
20 x 40 to 24 x 50 in..... 45%

NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron..... 70@75&10%
Steel ..... 40@45%

Slates, School—

Factory Shipments.
"D" Slates..... 50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless..60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%.
High Grade, 40%; Trojan..... 40%
Jockey 25%

Snaths—

Scythe ..... 55@60%

Snips, Tinners—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton..... 50&10%
Rogers & Bro., William Rogers' Eagle Brand..... 50&10%
Anchor, Rogers Brand..... 60%
Wm. Rogers & Son..... 60&10%

Miscellaneous

German Silver..... 60@60&5%

Tinned Iron—

Teas .....per gro. .50@55¢
Tables .....per gro. $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check..... 40%
Chicago (Coil)..... 40&10%
Gem (Coil)..... 20%
Pullman (Coil)..... 35%
Reliance (Coil)..... 40&10%
Star (Coil)..... 30%
Torrey's Rod, 39 in..... ℔ doz. $1.10

Carriage, Wagon, &c.—

1¼ in. and Wider: Per 100 lb.
Black ..... $4.75@$5.00
Half Bright..... $4.75@$5.00
Bright ..... $5.25@$5.50
Painted Seat Springs:
1½ x 2 x 26.....per pr. 49@52¢
1½ x 3 x 28.....per pr. 73@77¢

Sprinklers, Lawn—

American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ℔ doz..... $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $20..... 30%

Squares—

Nickel plated.. } List Jan. 5, 1900.
Steel and Iron. } 75&10@80%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel..... 15%

Squeezers, Lemon

Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade..... doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—

Barbed Blind.....lb. 6@6½¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.15; Galvanized $2.45
Poultry Netting Staples..... per lb. 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros.' 30%

Steelyards— ....30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates..... 25%
Green River..... 25%
Lightning Screw Plate..... 25%
Little Giant..... 25%
Reece's New Screw Plates..... 25%

Stoners, Cherry—

Enterprise ..... 25@30%

Stones—Oil, &c.

Pike Mfg. Co., 1907 list: ℔ lb
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 25¢
Lily White Slips..... 90¢
Rosy Red Slips..... 80¢
Washita Slips, Extra..... 80¢
Washita Slips, No. 1..... 70¢
Washita Slips, No. 2..... 40¢
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit..... 40%
Quickcut Emery and Corundum Axe Stone, Double Grit..... 33⅓%
Quickcut Emery Rubbing Bricks. 40%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small.. ℔ lb 10¢
Axe Stones (all kinds)..... 33⅓%
Turkey Oil Stones, Extra, 5 to 8 in..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips..... 40¢
Sand Stone..... 8¢

Scythe Stones—

Pike Mfg. Co., 1901 list:
Black Diamond S. S., ₱ gro. $12.00
Lamoille S. S., ₱ gro. $11.00
White Mountain S. S., ₱ gro. $9.00
Green Mountain S. S., ₱ gro. $6.00
Extra Indian Pond S. S., ₱ gro. $7.50
No. 1 Indian Pond S. S., ₱ gro. $7.00
No. 2 Indian Pond S. S., ₱ gro. $4.50
Leader Red End S. S., ₱ gro. $4.50
Quick Cut Emery, ₱ gro. $10.00
Pure Corundum, ₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
Electro (Artificial), ₱ gro. $12.00 33⅓%
Lightning (Artificial), ₱ gro. $18.00 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers, ₱ gro. $9.00

Stops—Bench—

Millers Falls 15&10%
Morrill's, ₱ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 50@50&10%

Plane—

Chapin-Stephens Co. 30%

Straps—Box—

Cary's Universal, case lots, 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket, doz. $1.66
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00 20%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%
P., S. & W. Co. 40&10&5%

Sweepers, Carpet—

	₱ doz.
Bissell Carpet Sweeper Co.:	
Superba, Crotch Mahogany	$36.00
Triumph, Fancy Veneers	$33.00
Parlor Queen, Fig. Rosewood	$30.00
Elite, Hungarian Ash	$29.00
Am. Queen, Fig. Mahogany	$27.00
Ideal, Bird's-Eye Maple	$25.00
Grand Rapids, Nickel, Japan	$24.00; $22.00
Standard, Nickel, $22.00; Japan	$20.00
Crown Jewel, Nickel, $21.00; Jap.	$19.00
Crystal, Glass Top	$36.00
Grand, 17 in. wide	$36.00
Club, 21 in. wide	$54.00
Hall, 28 in. wide	$60.00

NOTE.—Rebates: 50c per dozen on three dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks 90&25%
American Cut Tacks 90&25%
Swedes' Cut Tacks 90&25%
Swedes' Upholsterers' 90&35%
Gimp Tacks 90&35%
Lace Tacks 90&35%
Trimmers' Tacks 90&25%
Looking Glass Tacks 65%
Bill Posters' and Railroad Tacks 90&40%
Hungarian Nails 80&10%
Finishing Nails 70%
Trunk and Clout Nails 80%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks 90&10@90&10&10&5%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.: Gal.	Gasoline	Oil
30	$2.75	$3.00
50	$3.50	$4.00
100	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin 50@—%
Patent Leather 25@30&5%
Steel 33 1-3&5%
Chesterman's 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin 40&10@50%
Favorite, Duck and Leather 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin 40&10@60%
Metallic 30@30&5%
Patent Bend, Leather 25&5@25&10%
Pocket 40@40&5%
Steel 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c. 30@33⅓%

Ties, Bale—Steel Wire—

Single Loop 80&10&5%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White 20@20&5%

Haying—

Myers' Hay Tools 45%

Miniature—

Smith & Hemenway Co.'s, Davidson, ₱ doz., Nickel Plated, $1.50; Gold Plated $2.00

Saw—

Atkins' Cross Cut Saw Tools 35&5%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—

L. & I. J. White 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Limitation Oneida 75@75&10&5%
Newhouse 45@45&5%
Hawley & Norton 65%
Victor 75@75&10%
Oneida Community Jump 50%
Hector 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₱ doz., $13.25..$11.50 doz.
No. 3, Rat, ₱ doz., $6.50... $5.75 doz.
No. 3½, Rat, ₱ doz., $5.25.. $4.70 doz.
No. 4, Mouse, ₱ doz., $3.85.. $3.00 doz.
No. 5, Mouse, ₱ doz., $3.00.. $2.25 doz.
Oneida Community:
Out o' Sight, Mouse, ₱ doz.... $0.60
Out o' Sight, Rat, ₱ doz..... 1.25
Easy Set, Mouse, ₱ doz..... .35
Easy Set, Rat, ₱ doz..... 1.00
Wood Choker, Rat, ₱ doz. holes. .12
Premier Tin Choker, 5 hole, ₱ doz. traps..... .75

Trowels—

Disston Brick and Pointing... 25%
Disston Plastering 20%
Disston "Standard Brand" and Garden Trowels 30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in. $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ₱ gro. $6.00
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern 50&10%
Western Pattern 60&10%
Handy Trucks ₱ doz. $16.00
Grocery ₱ doz. $15.00
McKinney Trucks, each, net $10.00
Model Stove Trucks ₱ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized.	$67	$79	$89	$99	10%

Twine, Miscellaneous—

Flax Twine:
No. 9, ⅛ and ½-lb. Balls 23@25¢
No. 12, ⅛ and ½-lb. Balls 21@23¢
No. 18, ⅛ and ½-lb. Balls 18@20¢
No. 24, ⅛ and ½-lb. Balls 17½@19½¢
No. 36, ⅛ and ½-lb. Balls 17@19¢
Chalk Line, Cotton ½-lb. Balls 26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. 11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality 15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls 14½@15½¢
American 3-Ply Hemp, 1-lb. Balls 15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls 10@11¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls 13½@14½¢
Mason Line, Linen, ½-lb. Bls. 17¢
No. 26½ Mattress, ¼ and ½-lb. Balls, according to quality 30@60¢
Wool, 3 to 6 ply... B 9¢; A 10¢

Vises—

Solid Box 50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel 25%
Star, Solid Jaw 40%
Hollands':
Machinists' 40@40&5%
Keystone 65&5@70%
Lewis Tool Co.:
Adjustable Jaw 30%
Monarch, 50%; Solid Jaw 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip 15%
Merrill's 20%
Millers Falls Oval Slide Pattern 60&10%
Parker's:
Victor, 20@25%; Regulars 20@25%
Vulcan's 40@45%
Combination Pipe 55@60%
Prentiss 20@25%
Rock Island 25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps 30%
Perfection Saw Clamps, ₱ doz. $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60&5%; No. 870 40%.
Rock Island Pipe 25%

Wads—*Price per M.*

B. E., 11 up 60¢
B. E., 9 and 10 70¢
B. E., 8 80¢
B. E., 7 80¢
P. E., 11 up $1.00
P. E., 9 and 10 1.25
P. E., 8 1.50
P. E., 7 1.50
Dis. 15%
Ely's B. E., 11 and larger $1.70@1.75
Ely's P. E., 12 to 20 $3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 45&10%
Ground 50&5%
Plain or Unground 60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles 65&10%
Covered Wares:
Tinned and Turned 35&10%
Enameled 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware 33⅓%
Iron Clad Ware 70&10%
Lava and Volcanic, Enameled 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles 65@65&5%
Avery Kettles 60%
Porcelained 50&5@50&10%
Never Break Spiders and Griddles 65&5%
Never Break Kettles 60%
Solid Steel Spiders and Griddles 65&5%
Solid Steel Kettles 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone 40@40&10%

Washboards—

Solid Zinc:	₱ doz.
Crescent, family size, bent frame	$4.05
Red Star, family size, stationary protector	$4.05
Double Zinc Surface:	
Saginaw Globe, family size, stationary protector	$3.55
Cable Cross, family size, stationary protector	$3.60
Single Zinc Surface:	
Naiad, family size, open back, perforated	$3.00
Single Saginaw Globe	$2.85
Brass Surface:	
Brass King, Single Surface, open back	$4.05
Nickel Plate Surface:	
No. 1001 Nickel Plate, Single Surface	$3.60
Glass Surface:	
Glass King, Single Surface, open back	$3.95
Enamel Surface:	
Enamel King, Single Surface, ventilated back	$3.95

Washers—Leather, Axle—

Solid 90@90&10%
Patent 90@90&5%
Coil: ⅞ 1 1⅛ 1¼ Inch.
11¢. 12¢. 13¢. 15¢. per box

Iron or Steel—

Size bolt... 5-16 ⅜ ½ ⅝ ¾
Washers... $5.90 5.00 3.70 3.50 3.30
The above prices are based on $5.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots, per lb. 1¾@2¢

Wedges—

Oil Finish lb., @3¢

Weights—Hitching—

Covert Mfg. Co. 30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District $30.00
Southern Territory $24.00@25.00
Western and Central Districts $25.00@28.50

Wheels, Well—

8-in., $2.22; 10-in., $2.82; 12-in., $3.36; 14-in., $4.80.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 72¢&10¢71½%
10 to 18 72½¢&10¢10%
19 to 26 75¢&10¢&2½%
27 to 36 77½¢&7½%
Galvanized:
6 to 9 72½¢&10%
10 to 14 72½¢&10¢&5%
15 to 16 72½¢&10¢&5%
17 to 18 72½%
19 to 26 70¢&5¢&2½%
27 to 36 65¢&10¢10%
Coppered:
6 to 9 65¢&10¢10%
10 to 14 70¢&10¢&5%
15 to 18 65¢&10¢&10%
19 to 26 70¢&5¢&2½%
27 to 36 72½¢&10¢&2½%
Tinned:
6 to 18 67¢&10¢&10%
Brass 17¼¢ lb., base
Copper 32¢ lb., base
Cast Steel Wire 50%

Spooled Wire—

Annealed and Tinned 70&10%
Brass and Copper 60&10%
Retailers' Assortments, per box $2.10@$2.40
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods 90&15%
Brass Wire Goods 90@90&10%
Brass Cup and Shoulder Hooks 80&15%

Wire Cloth and Netting—

Galvanized Poultry Netting 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.30
Standard Galv. Hardware Grade: Per 100 sq. ft.
Nos 2, 2½ & 3 Mesh $2.50
Nos. 4 and 5 Mesh $2.75
No. 6 Mesh $3.00
No. 8 Mesh $3.50

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural 75@75&10%
Alligator or Crocodile 70&10@75%
Baxter Pattern S Wrenches 70&5@70&10%
Drop Forged S 45@45&5%
Acme 60&10%
Alligator Pattern, 70%; Bull Dog 70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut 50%
Combination Black 40&5%
Merrick Pattern 50%
Boardman's 40%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model. 40&10&5&5%
Coes', Genuine Hammer Handle 40&10&5&5%
Coes' "Mechanics'" 40&10&10&5&5%
Donohue's Engineer 40&10%
Eagle 70%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots 50&5%
Less than case lots 50%
W. & B. Railroad Special:
Case lots 50%
Less than case lots 40&10&5%
Solid Handles, P., S. & W., 50&10%; full cases 50&10&5%
Stillson 65%
Uwanta Wrench Co.:
Railroad Special, Iron Handle, 40&10&5%
Other Wrenches 50%
Vulcan and Agrippa Chain 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '02 90%

Zinc—*(Cask lots at mill.)*

Sheet, per 100 lb. $7.00